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Cleveland, O.
Oct. 11, 1928

NEW Velie 5-cylinder radial aircraft engine, and section of assembly line.

Heat Treating *Parts for Airplane* Manufacture

By J. B. Nealey

AS THE production of airplanes increases and experience in design and construction of parts is accumulated, it is becoming more and more apparent that heat treating plays a more important part in aeronautical development than it does in automobile engineering. The explanation is twofold. First, the necessity of limiting the weights of airplane parts requires heat treating and second, the factor of reliability prompted by considerations of safety is paramount.

The extent to which aircraft builders rely on heat treating is well illustrated at the plant of the Mono-Aircraft Co., Moline, Ill., a subsidiary of the Velie Motors Corp. This company is building a two-seater, enclosed monoplane which has been designed for private owners. A Velie engine is used. Its features include a solid master connecting rod and two-piece crankshaft, simple valve mechanism and clean lines in front, making for minimum head resistance.

The author is identified with the American Gas association, New York.

At the present time the monoplane is being built in a separate plant with more than 300,000 square feet of floor space. All the machinery and facilities of a large automobile manufacturing corporation are available which will permit an increase in production from 36 a week to 50 a day, if necessary.

Several different kinds of heat treatment are employed, some of which have been specially worked out to develop certain specific qualities in the metals used. For instance, some of the fittings on the plane are of duralumin, an alloy of aluminum. These are heated in a hot solution of sodium nitrate and potassium nitrate contained in a cast iron pot located in a brick foundation. They are heated with gas to a temperature of 940 degrees for from 15 to 30 minutes, the shorter period being sufficient for the thinner walled tubes.

The heat treatment effects increase gradually with the rise in temperature until the maximum solution of soluble constituents has been attained.

Section of wing construction department, in plant devoting 300,000 *square feet to building monoplanes*

Accurate temperature control is vital for if the heat runs too high, partial melting and burning of the alloy take place with consequent loss of ductility and strength. After the correct temperature has been reached and the soaking period completed the work is then quenched in water and it is necessary that there shall be no delay in moving it from the heating medium to the quenching medium. While for very thin material quenching in air would suffice to produce the required physical properties, a water quench materially increases the resistance to corrosion. A gas-fired nitrate tank is used.

The work then is "aged" at room temperature for four days or until it acquires its maximum tensile strength, yield point and percentage of elongation.

All parts of the motor are heat treated. The gears, smaller gear shafts, wrist pins, piston pins, etc. are formed from S.A.E. 3115 steel of the following analysis: Carbon, 0.10 to 0.20; manganese, 0.30 to 0.60; phosphorus, 0.04 maximum; sulphur, 0.045 maximum; nickel, 1.00 to 1.50; and chromium 0.45 to 0.75 per cent.

These parts are carburized, the practice being to pack in boxes with carburizing material, heat to from 1625 to 1675 degrees Fahr., cool in boxes, reheat to 1375 to 1425 degrees Fahr., quench and then draw at from 250 to 500 degrees Fahr. This gives refinement of grain structure of both the core and the case. A case of 1/32-inch is obtained with a scleroscope hardness ranging from 70 to 80.

In the case of gears and some other parts that are made from forgings these are first normalized at 1525 to 1650 degrees Fahr., from one-half to 1 hour, to remove the forging strains. The stock is then machined, teeth cut, etc. The parts are then packed in boxes, heated to 1675 to 1700 degrees Fahr. for from 1½ to 8 hours, cooled in the boxes to room temperature and then removed from the boxes. They are then reheated to 1600 to 1625 degrees Fahr. for 10 to 45 minutes, quenched in oil to refine the core, returned to furnace and heated to 1400 to 1425 degrees Fahr. for 10 to 45 minutes longer and then quenched in oil to refine the grain structure of the case. The draw is accomplished at from 250 to 500 degrees Fahr., the time varying from 20 minutes to two hours according to the sectional area and physical qualities desired.

The connecting rods, master rods, crankshafts, etc. are forged from S.A.E. 3140 steel which is of the same analysis as S.A.E. 3115 with the exceptions that the carbon content runs from 0.35 to 0.45 and the manganese from 0.50 to 0.80 per cent. Great care must be exercised in heating forgings from steel of this analysis. If heated too rapidly the metal near the surface expands at a greater rate than that closer to the core thereby causing checking, hard spots and separation between the core and shell.

For this reason these parts are preheated to from 500 to 900 degrees Fahr. before putting them into the high heat furnaces. Bearing in mind

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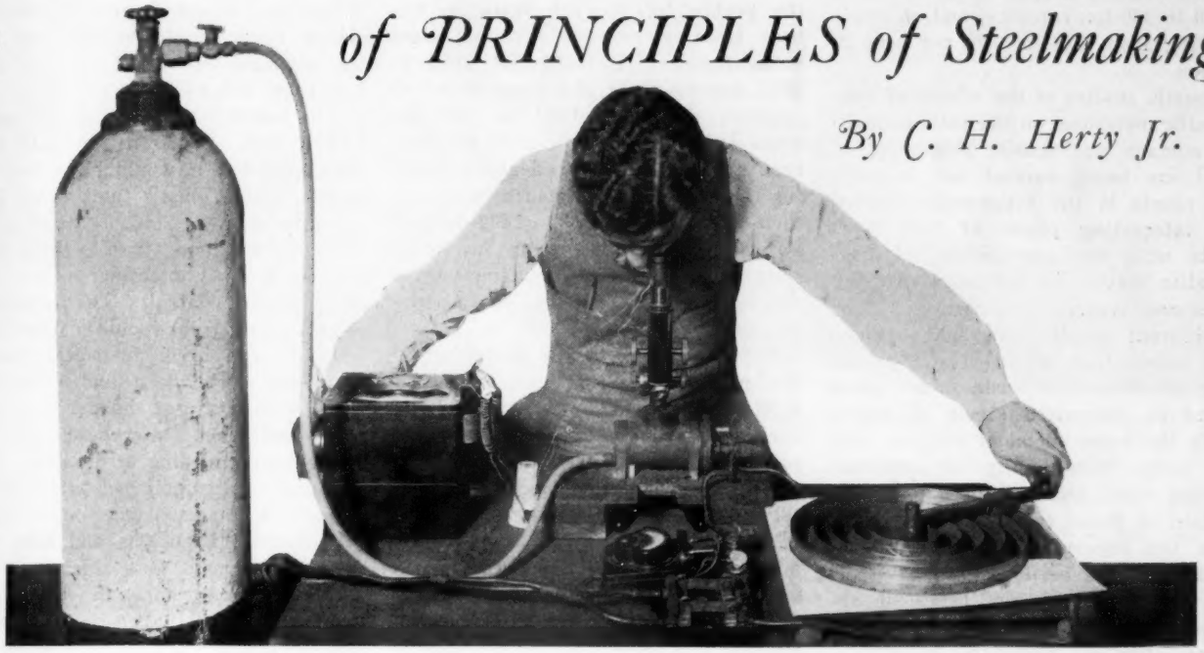
One of the assembly lines in a monoplane plant, showing the installation of engines

Users Need Thorough Knowledge of PRINCIPLES of Steelmaking

By C. H. Herty Jr.



DURING the past few years there has been a growing realization among plant managers, operators and metallurgists that many problems arising in the manufacture and use of steel require a more thorough knowledge of the fundamental principles involved in steelmaking than is available at present. With this thought in mind the United States bureau of mines, in conjunction with the Carnegie Institute of Technology and a metallurgical advisory board composed of members of various steel-producing and consuming companies of the Pittsburgh district, began in 1926 a study of various problems connected with the manufacture of steel. The organization consists of six members of the staff of the metallurgical section of the bureau of mines, two research metallurgists and one analyst, supplied by the metallurgical advisory board, part time of members of the institute staff, and five research fellows taking graduate work at the institute, three of whom are supplied by the metallurgical advisory board and two by the institute.

The total cost of the research, not including bureau or institute overhead, is approximately $44,000 per year, of which $13,500 is contributed by the industry through the advisory board, $27,000 by the bureau, and the remainder by the institute. During the second year of the program 29 companies contributed financial and other assistance in carrying out the work.

A special open meeting of the advisory board is held in the fall of each year at the Pittsburgh experiment station of the bureau of mines. At the seventeenth meeting of the board to be held Oct. 19, 1928 progress of the various activities of the metallurgical work will be discussed.

Nature of Slags Important

There is a well known saying among steelmakers that the way to make steel is to make good slags and let the steel take care of itself. To find out how to make good slags it is necessary to know what makes a slag a "good slag" and why. This problem is unquestionably the most important single item in iron and steel making and a large portion of the program is centered on the properties of slags. How many impurities a slag will absorb from the steel in a given length of time; how fast iron oxide, the agent for the removal of carbon, manganese, phosphorus, silicon, and other imprities from the metal, dissolves in the metal from a given type of slag; and what changes occur in other physical properties with changes in slag composition—these are some of the questions which are being answered.

At the outset of the work it was realized that the success of the program depended to a considerable extent on the selection of suitable methods for determining oxide in steel. The Ledebur method, reduction with hydrogen, is used for the determination of ferrous oxide in steels low in carbon, and new methods for the determination of other oxides are under investigation. The Dickenson method, solution of the steel in cold dilute nitric acid with a suitable treatment of the residues, has been found to be satisfactory for killed steels but not so for rimmed steels. Attention in this work is being centered on methods for the determination of manganese oxide in steel.

With the increased stringency of specifications on various grades of steel and the special qualities demanded in many common grades, the problem of inclusions in steel has become a vital one. This problem is being attacked in four ways. First, a thorough study of deoxidation is being carried out under carefully controlled conditions, and various types of inclusions are formed in the steel and trapped therein by rapid cooling of small ingots. Studies on degree of deoxidation, action of the inclusions in the liquid steel, forging properties, corrosion and physical testing of the steel and other tests are being carried out on steels treated with a large number of deoxidizers, from the simple alloys, ferrosilicon, ferromanganese and aluminum to complex ternary alloys of these three. The special deoxidizers, zirconium, titanium, and vanadium also are being investigated.

Second, the oxides resulting from deoxidation of steel with any element are being studied separately and under conditions where the maximum purity

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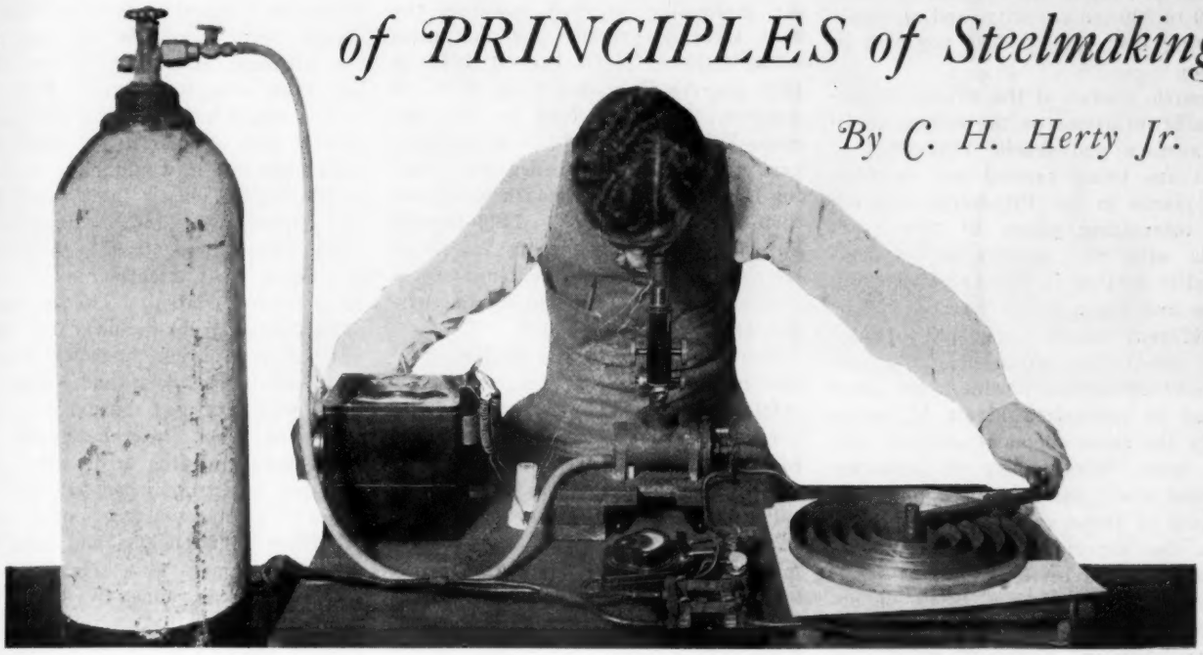

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of the melts involved can be obtained.

Third, investigations on the formation and elimination of inclusions, as indicated by laboratory tests, are being carried out in open-hearth furnaces of 40 to 300-ton capacity, and on steels varying from 0.08 to 0.90 per cent in carbon.

Fourth, studies of the effects of nonmetallic inclusions on the rolling quality, surface and tensile properties of steel are being carried out in various plants in the Pittsburgh district. An interesting phase of this work deals with the segregation of nonmetallic matter in ingots of varying sizes and types.

Different results on depth of carbon penetration, grain size and uniformity of surface hardness are often found in carburized steels of essentially the same chemical analysis, and the term "abnormality of case-carburized steel" has been used to denote certain of these variations.

In the experimental work on this problem it has been found that steels may show two distinct types of abnormality on carburization, grain size abnormality and structural abnormality. The first is usually due to the addition of certain elements to the steel and may be regulated by the elements added in the manufacture of the steel. For example, increasing manganese tends to increase the grain size while the addition of vanadium refines the grain, and the carburized piece will show grain size abnormality; that is, smaller grains than usually found.

Structural abnormality has been found to be associated with either a high ferrous oxide content or with the presence of very small inclusions in the experimental steels made at the bureau. Apparently as the inclusions become larger they affect structural abnormality less and less. Heat treatments do not affect this type of abnormality.

Heat Treating Parts Used in Building Airplanes

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the preheating in each instance, the heat treating practice for this steel is as follows: Normalize at 1650 to 1675 degrees Fahr. for from 20 to 45 minutes, anneal at 1500 to 1525 degrees Fahr. for from 10 to 45 minutes, heat to 1600 to 1625 degrees Fahr. for 10 to 45 minutes, quench in oil and then draw at from 800 to 1400 degrees Fahr. for from 20 minutes up to an hour and a quarter according to the size of part and physical characteristics required.

The main idea in the designing of this motor and plane was, of course, safety and the weakest member is 13 per cent stronger than the required safety factor. Next in importance came weight and the maximum physical properties were developed by heat treating in order that the weight might be reduced. The axle in the landing gear is a good example of this. Made of seamless tubing of chrome-molybdenum steel, (U. S. Air Service 10231) this part is 1½ inches in diameter and the walls 11 gage. If not heat treated a tube 2 inches in diameter and of the same wall thickness, weighing three pounds more would be required. Hence a saving of three pounds was made as well as a material reduction in air resistance.

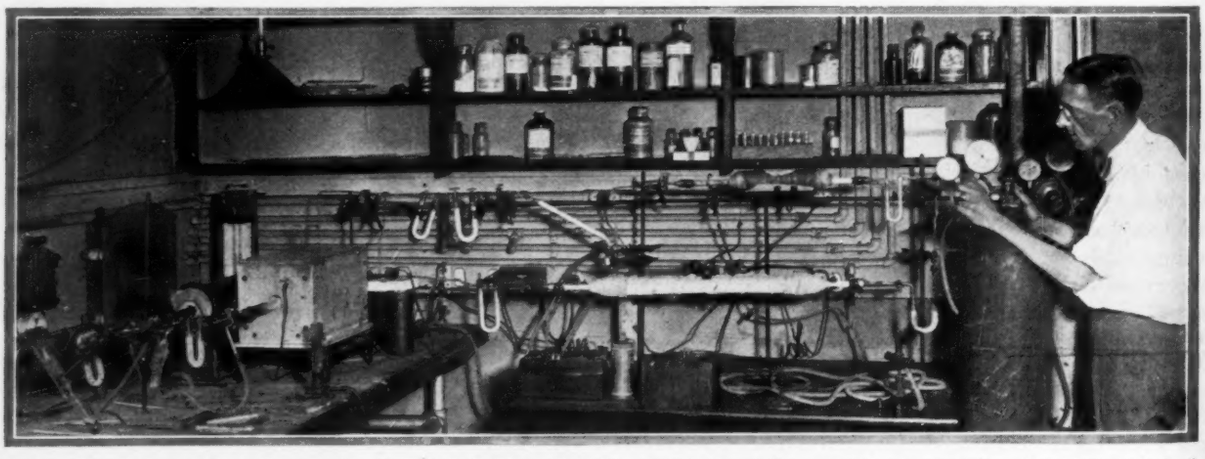
In heat treating, this part is put into a furnace at about 1200 degrees Fahr. and the temperature gradually raised from 1600 to 1625 degrees Fahr. It is held at this heat for 10 minutes, quenched in water, preheated to 500 degrees Fahr. and then brought up from 750 to 775 degrees Fahr. for half an hour and then cooled slowly. This just about doubles the tensile strength which now is 180,000 pounds per square inch. However, this is not the maximum strength that could be obtained by varying the heat treatment nor is this desirable in landing gear axles and bolts.

The reason is that the elongation factor drops sharply at this point and it has been found in practice that the elastic limit should be at least half the ultimate strength. If the draw had been only 400 degrees Fahr. the tensile would have been 230,000 pounds and a still smaller tube could have been used but it would have been too brittle, as the elastic limit would have been reduced to 145,000 pounds.

The principal requisite in these finely developed heat treatments is exact temperature control. The equipment in this department includes four intermittent type brick furnaces about 5 feet wide, 8 feet deep, and 5 feet high fired with six gas burners on each side and used interchangeably for hardening, annealing or drawing. Carburizing is accomplished in three furnaces of similar construction, of slightly different dimensions and fired with four gas burners to a side.

Quenching is done in seven steel tanks the quenching medium being circulated through a cooling system, and agitated by air to insure a uniform quench. The salt baths are contained in cast iron pots 16 inches in diameter and 18 inches deep set in brick foundations and heated with four gas burners each.

A triple furnace for heat treating small tools is of unique design. This consists of a cyanide pot with a small square brick furnace on each side and all three held together in the same frame. The one on the right is used for carbon steels and for preheating high speed tool steels. It is fired with a single burner. The one on the left, which has four burners, is used to heat treat high speed tool steels and the cyanide pot, fired with two gas burners, is used for producing the case. An overhead monorail system with air hoists serves the entire department.



Apparatus for determining iron oxide in steel by the Ledebur method. The range of samples investigated includes pure iron-oxygen alloys, especially deoxidized steels, samples from open-hearth furnaces, and samples of various finished products

One of the large exhibits is that of the Electric Steel Founders Research Group

Diversity of Equipment Is Feature of National Metals Exposition

PRACTICALLY every line of equipment dealing with the manufacture, heat treatment and processing of metals, is represented in the Tenth National Metal exposition being conducted in Commercial Museum, Philadelphia, this week. Some 80,000 square feet in the exhibition hall is devoted to the displays of machinery for this purpose and the major portion of it is in operation to correspond as nearly as possible to actual service conditions. In the neighborhood of 50,000 people interested in the working of metals were expected to visit the exposition during the five days that the doors remain open.

Furnaces of the gas, oil and electricity burning types, constitute one of the important divisions of the show. Many improvements are to be noted over models displayed last year. Steel products in all stages from the raw state to the finished commodity are exhibited by a number of manufacturers and are attracting considerable attention. Several companies are showing equipment for metallurgical examination and testing, while others are demonstrating many types of temperature control apparatus.

While the exhibition of metal cutting tools is somewhat limited, several companies show a number of modern machine tools. Welding equipment of both gas and electric types constituted another large section of the exposition with a wide range of welded products available for inspection. The display of castings of both steel and gray iron is particularly noteworthy. Among miscellaneous products are refractories, abrasives, carburizing and hardening materials and cleaning compounds.

Heat Treating Furnaces Improved in Design

FURNACES of improved types for all varieties of heat treating and metallurgical operations except steel making, melting and refining, compose one of the major groups of equipment in the 1928 exposition. The American Gas association, New York, and perhaps half a dozen co-operating companies occupy considerable space in one corner of Commercial Museum. All types of gas-fired heat treating furnaces are in operation as are practically all types of burner and combustion systems. A feature which contributes to the interest is a completely equipped metallurgical laboratory with an improved automatic sample polishing machine, hardness tester and metallographic microscope in operation.

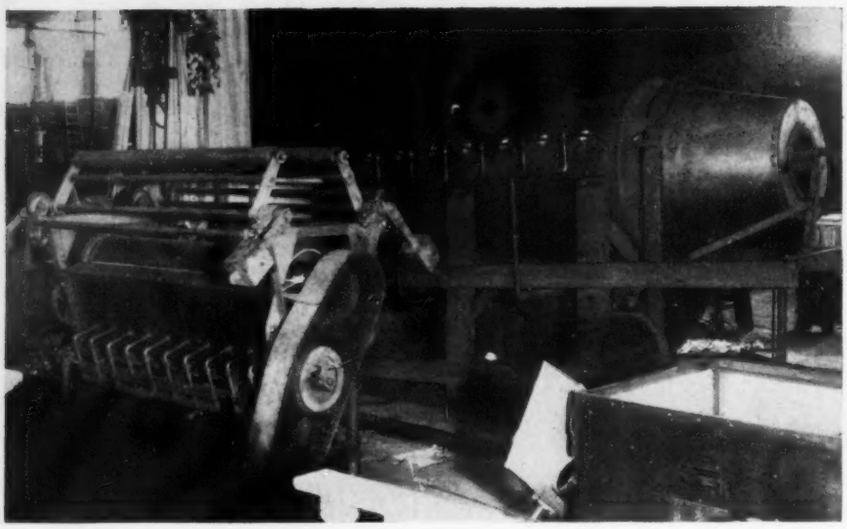
Surface Combustion Co., Toledo, is operating a heat treating furnace with two-stage burners and automatic controls for temperatures from 1200 to 2000 degrees Fahr.; a small oven furnace for treating high-speed steel; and a standard forge furnace. Not operating are a small oven heat treating furnace, a circular cyanide hardening furnace, several nonferrous melting furnaces and numerous types of burners.

Models Duplicate Equipment

Featured by the American Gas Furnace Co., Elizabeth, N. J., is a new large-size gas-fired rotary retort carburizing furnace taking from 1000 to 1250 pounds per charge; various types of heat treating furnaces and burner equipment. Gehnrich Indirect Heat Oven Co. Inc., shows in operation a gas-fired continuous-type japan drying oven for small parts.

Eclipse Fuel Engineering Co., Rockford, Ill., is operating several types of gas-burning heat treating furnaces and burners; while C. M. Kemp Mfg. Co., Baltimore, in demonstrating that its automatic gas premixer mixes gas and air in accurate proportions burns one jet of gas under water and another in a glass cylinder through which city gas is passed without igniting.

George J. Hagen Co., Pittsburgh, uses photographs and catalogs to describe the line of gas, oil, electric and coal-fired heat treating furnaces which it manufactures. The same method is employed by W. S. Rockwell Co.,



Gas fired furnaces are displayed by the American Gas Furnace Co.

New York, to show its line of industrial furnaces and special types of blast gates for controlling air lines. Two accurately-constructed one-eighth size operating models, one of a new continuous pan hardening furnace with automatic charging and discharging and the other of a continuous conveyor beam furnace are features of the exhibit of McCann Harrison Corp., Cleveland. Mahr Mfg. Co., Minneapolis, is operating a model of rotary forging furnace, a blower and gas and oil burners.

Complete lines of electric heat treating furnaces with automatic temperature control are shown in operation at booths of General Electric Co., Schenectady, N. Y., and the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Hevi Duty Electric Co., Milwaukee, is operating a line of electric heat treating furnaces of circular and box types in which the temperatures of the steel are determined by measuring the magnetism in the material rather than by pyrometer. This company has just recently applied this old well-known principle to its equipment and is said to be the first to do so.

Globar Corp., Niagara Falls, N. Y., located in the same booth with its parent organization, the Carborundum Co., is operating at forging temperature a furnace equipped with a nonmetallic heating element. Several sizes of elements of the same type are displayed. A high-speed steel induction-type electric furnace is demonstrated by the Ajax Electrothermic Corp., Trenton, N. J., while American Metallurgical Corp., Boston, is showing in operation several new electric furnaces of the box type and types for lead, salt and cyanide treatment.

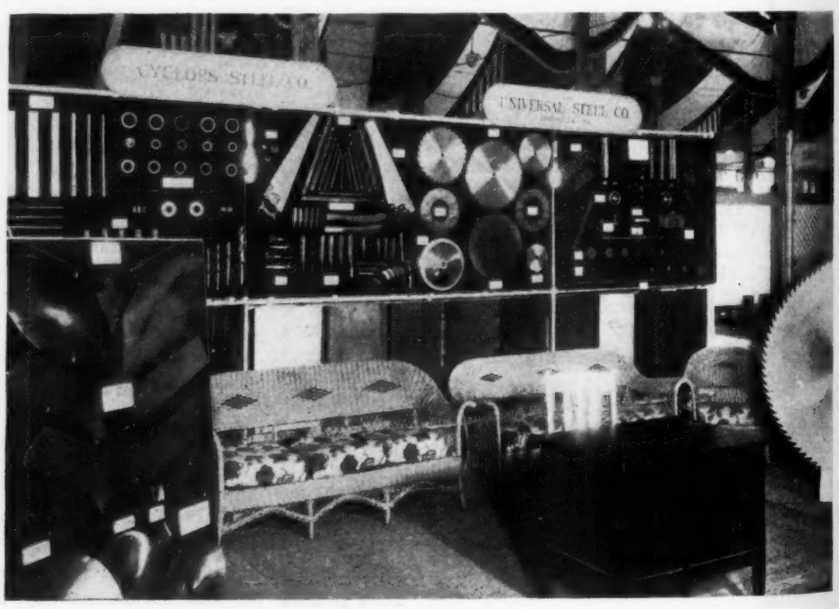
The Electric Furnace Co., Salem, O., uses photographs and literature to explain its electrically-operated heat treating furnaces and equipment for all purposes. A special type of heating grid is employed. The same method is taken by Holcroft & Co., Detroit, to illustrate the most recent installations of its equipment. In addition, moving pictures are used. Electric laboratory ovens manufactured by Young Bros. Co., Detroit, are described by photographs and literature. Of further interest are working models of continuous conveyor ovens. The National Electric Light association, New York, has adopted photographs and a 5-reel motion picture to illustrate modern applications of electric furnaces to annealing, carburizing, hardening, vitreous enameling and steel melting. Steel parts heat treated in these furnaces are on display.

Rivets Heated Electrically

Equipment for heating rivets from ½ to 1⅛ inches diameter and lengths from 1 to 7¾ inches by passing a current of electricity through them is demonstrated by the American Car & Foundry Co., New York. A machine for heating by the same method rods at any spot and length up to 8 inches for forging and upsetting purposes also is operated. A line of electric strip heaters, space heaters, immersion units and other heaters is shown by Edwin L. Wiegand Co., Pittsburgh. Bellis Heat Treating Co., Branford, Conn., is showing its usual line of salt bath furnaces heat treating small tool and machine parts. In addition this company showed for the first time a new equipment in which the required heat in the special salt is secured by passing a current of electricity through it between electrodes.

A gas compressor and receiving tank equipped with special regulating devices and manufactured by the Sullivan Machinery Co., Chicago, is installed in the American Gas association section and is supplying gas at from 5 to 10 pounds pressure to the various furnaces installed. In its own booth, this company is operating a 4-cylinder air compressor and is furnishing air to various exhibitors at 100 pounds pressure. Spencer Turbine Co., Hartford, Conn., is demonstrating several turbocompressors for supplying air to oil and gas burning furnaces. One unit is supplying air to operating exhibits.

Several exhibitors are displaying firebrick and refractory materials for industrial furnace application. Carborundum Co., Perth Amboy, N. J., is demonstrating the relative conductivity of silicon carbide, aluminum oxide and fireclay tile by operating a small electric furnace equipped with nonmetallic heating elements manufactured by its subsidiary, the Globar Corp., Niagara Falls, N. Y. In the general display are refractories for



Saws, knives and other cutlery demonstrate the uses of heat treating

all types of industrial furnaces. Celite Products Co., Los Angeles, is including in its line of insulating materials refractory brick, high temperature cements and waterproofing compounds. The difference in radiation between insulated and solid firebrick walls is being demonstrated.

Armstrong Cork & Insulation Co., Pittsburgh, is showing a complete line of refractory and insulating materials for industrial applications. This includes firebrick, cork coverings and corkboard. It is showing also its high pressure coverings, blocks and cement for steam and power plants, ovens, etc., covering for refrigerating lines, insulation for cold storage buildings and roofs for industrial buildings. Refractory brick and insulating packings constitutes the display of the General Insulating & Mfg. Co., Alexandria, Ind. Botfield Refractories Co., Philadelphia, shows firebrick structures bonded with firebrick cement and other refractory mixtures. A gun for shooting the cement on structures also is explained.

Materials and equipment for the hardening room are featured in the display of the Case Hardening Service Co., Cleveland, and the Bell & Gossett Co., Chicago. These included carburizing and cyanide hardening compounds, cyanide, drawing salts, hardening salts, nickel-chromium aluminum pots and boxes, lead pot covering, anticarburizing paint, pressed steel pots and oil coolers. Carburizing compounds, annealing carbon, lead pot carbon and electrode carbon constitute the line of products shown at the booth of the Char Products Co., Indianapolis. Cyanide materials, heat treating salts, and chemicals used in the electroplating trade comprise the exhibit of Roessler & Hasslacher, Chemical Co., New York.

Many Welding Machines Shown in Operation

LATEST improvements in the design of electric welding machines and equipment is prominently displayed in a section on the Exposition floor set apart for this purpose. Comprising the exhibit of the Lincoln Electric Co., Cleveland, are complete electric arc welding equipment and various commodities built of welded steel. A motor operating under water is one of the features in the company's booth. Welded specimens including a truck wheel, an end ring of an electric motor, motor base rails, rotor spiders, etc., are attractively arranged on a display board. Federal Machine & Welder Co., Warren, O., has a large spot welding machine and two other machines adapted to this purpose available for examination. A rolling mill pinion repaired by welding, test specimens of thermit welds, alloys and equipment for welding may be seen at the booth of Metal & Thermit Corp., New York.

Various Spot Welders on Display

A 6-kilowatt spot welder is shown in operation at the booth of the Acme Electric Welder Co., Philadelphia, as well as a nonoperating spot welder with a 48-inch throat and butt-welding attachment. A motor-generator type of welding machine is being operated by Wilson Welder & Metals Co., Hoboken, N. J. A gasoline-engine driven welder affords ample comparison between the two types of machines displayed by this company. Both alternating and direct-current welders, an automatic welding head and a wide assortment of welding rods at the booth of Una Welding & Bonding Co., Cleveland, gives some idea of the equipment required for joining metal by welding. Various steps involved in the welding of an automobile wire wheel, numerous applications of welding an automobile chassis frame and dies for facilitating welding operations form the center of attraction at the booth of Elkon Inc., New York.

Those interested in oxyacetylene welding will find a wide assortment of equipment at the booth of the Linde Air Products Co. and associated companies, New York. Oxyacetylene containers, carbide drums, cutting torches, flood lights, a stationary acetylene generator and a low-pressure acetylene generator of 200 pounds carbide capacity occupies a large portion of this company's booth.

Shows Welded Airplane Fuselage

Part of an airplane fuselage is suspended and shows the welded assembly of alloy steel tubing. One of the latest household gas refrigerating units assembled by welding may be examined. This unit requires over 50 welds and is tested to over 900 pounds per square inch pressure, the welding operations being performed by girls. Also available for examination are various welded commodities of aluminum, copper, nickel, lead, steel, etc.

While the booth of the Air Reduction Sales Co., New York, includes numerous cylinders of oxygen and acetylene gases, oxygen discharge manifold, welding and cutting torches the feature of the company's display is a machine for the mechanical cutting of a steel plate, forgings and billets with an oxyacetylene torch. It is equipped with a motor-driven tracing device to follow the pattern or templet which automatically is reproduced by the oxygen cutting jet in the ratio of 1 to 1. It is shown for the first time. Repetitive mechanical cutting of shapes from steel plates on production work is accomplished by a machine which also is displayed. The movement of the cutting torch automatically is guided by a cam conforming to the shape to be cut, with a motor-driven cam following device. The company also is showing a new line of its cutting and welding apparatus such as torches and pressure regulators.

In the welding section, American Steel & Wire Co., Chicago, has an attractively arranged display of wire products which it manufactures. One display board shows various styles and sizes of nails, spikes, tacks and staples; another a wide assortment of welding rods; and, a third innumerable types and sizes of coil springs manufactured by the company. A welding machine showing the adaptability of the company's welding rods may be seen in operation.

Welding is being demonstrated at the booth of the American Brass Co., Waterbury, Conn. In addition to a complete line of copper alloy welding rods the company has on display various welded automobile parts such as an engine, manifold, cylinder head, timing gear housing, etc. Morris, Wheeler & Co. Inc., Philadelphia, is exhibiting gas and electric welding rods, welding helmets, welding hand shields, electrode holders, fluxes and lenses. Page Steel & Wire Co., Bridgeport, Conn., is featuring a flame test for comparing various grades of welding wire. Several models of a new electric welding unit in operation and various cutting electrodes are being exhibited by Fusion Electric Welding Corp., Chicago.

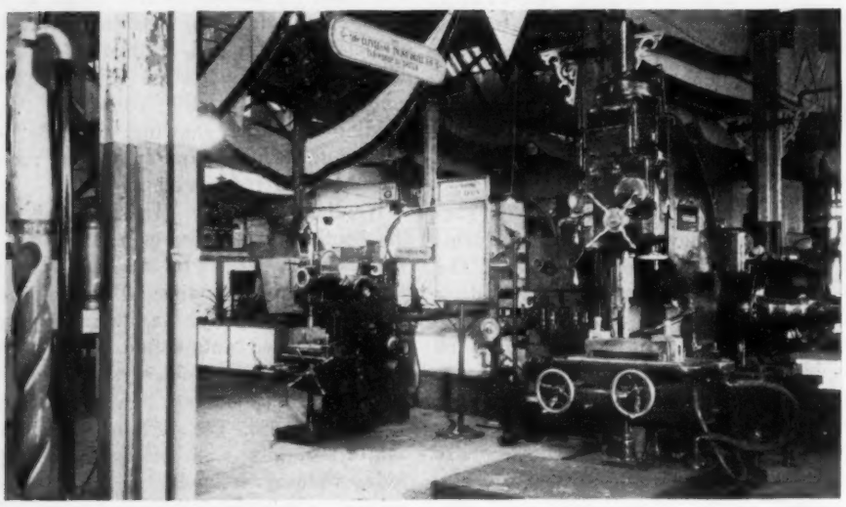
Welding Accessories Are Numerous

At the booth of the Haynes Stellite Co., Kokomo, Ind., is to be found a well-balanced display of welding equipment. Acetylene torches, oxygen and acetylene tanks and hose connections for demonstrating the application of welding rod to the bare metal using an oxyacetylene blowpipe, a display board demonstrating other products of the company such as tool bits, bar stock, welded tools, milling cutters and other tools used for machining cast iron, malleable iron, brass, bronze, mild steel, etc., are

being displayed. The Haynes company is showing also the method of applying its welding rod to metal parts requiring resistance to abrasion. A new oxygen and acetylene regulator, gages and torches are on display at the booth of the K-G Welding & Cutting Co. Inc., New York, and similar apparatus at the booth of Torchweld Equipment Co., Chicago. Examples of recent developments in flash, seam and spot welding as applied to steel automobile bodies, disk and wire wheels are shown by the Budd Mfg. Co., Philadelphia.

Machine Tool Makers Demonstrate Equipment

A DIVERSIFIED and improved array of machinery equipment is being displayed. Eight double stand grinders and buffers are being demonstrated by Hisey-Wolf Machine Co., Cincinnati, along with such other equipment as drills, screw drivers, nut setters and so forth. Polishing and finishing machines, including the centerless type, are under power at the booth of Production Machine Co., Greenfield, Mass. Shaper, thread, milling and special cutters are exhibited by Michigan Tool Co., Detroit; also inserted blade cutters and hobs. Two high-speed drill presses, demonstrating drills at various speeds and feeds, feature a complete display of the company's products at the booth of Cleveland Twist Drill Co., Cleveland.



One of the large machine tools that stands out prominently in the exposition

Two quadruple punching and shearing machines are in operation and one single end punch and one punch and shear on exhibit by David H. Smith & Sons Inc., Brooklyn. A spring coiling machine, one of a series of 11 sizes, and adapted to take wire from 0.004-inch up to ⅝-inch diameter and to produce springs of various kinds, is being operated by Sleeper & Hartley Inc., Worcester, Mass.

Hydraulic Tool Works, Philadelphia, are demonstrating hydraulic metal punches, punching 13/16-inch holes in the flange of I-beams and 1 1/16-inch holes in the web of H-columns. Journal and thrust bearings are included in the exhibit. Rotor Air Tool Co., Cleveland, is demonstrating portable pneumatic grinders and drills; also an air sander for use with sanding disks and for use with cup wheels for flat finish surfacing.

A newly designed 36 by 60-inch tumbling barrel which requires no handling of the tumbling materials, is attracting considerable attention at the booth of Ideal Industrial Machinery, Cincinanti. The machine is motor driven and equipped with a power loader. Photographs of a number of special installations also are exhibited. Cast steel die sets are being exhibited for the first time by Danly Machine Specialties Inc., Cicero, Ill., along with semisteel standardized and special die sets, leader pins, bushings, die shoes, punch holders, dowel pins, pry bars, goose neck clamps, and swivel head cap screws; also shown are automatic stock stops for punch presses, hollow-head cap and set screws, pressure pad springs, fillister and socket heads, stropper bolts lap and lap arbors and transparent die set templets.

Milling cutters, reamers, broaches, screw machine form tools and lock washers are being exhibited by Illinois Tool Works, Chicago. High speed and carbon drills and reamers, taps, dies and milling cutters are being shown by Morse Twist Drill & Machine Co., New Bedford, Mass. Other exhibitors of cutting units are the Colonial Tool Co., Detroit; Michigan Tool Co., Detroit; Standard Tool Co., Cleveland; Andrew C. Campbell Inc., Bridgeport, Conn.; and National Twist Drill & Tool Co., Detroit.

A new type of horizontal disk grinder is being demonstrated by Porter-Cable Machine Co., Syracuse, N. Y. High-speed production lathes turning and facing bronze bushings also are a feature of an exhibit, which includes sanders and grinders. Ampco Twist Drill Co., Jackson, Mich., is operating two automatic combination milling and drilling machines, requiring approximately 50 square feet and weighing, combined, 10,000 pounds.

New Departure Mfg. Co., Bristol, Conn., has a wide display of ball bearings, with a demonstrating device which is attracting considerable attention. A variety of types and sizes of ball bearings also are shown by McGill Metal Co., Valparaiso, Ind.

Treadwell Engineering Co., Easton, Pa., is depicting its line of products in an attractive display. Union Mfg. Co., New Britain, Conn., is exhibiting a wide variety of chucks, also some new developments in hoists and trolleys. Giddings & Lewis Machine Co., Fond-du-Lac, Wis., is demonstrating several of its major products. Unishear Co. Inc., New York, is exhibiting its complete line.

Displays New Chucking Unit

A new 6-inch multiple spindle chucking machine, threading-type, motor-drive, is being shown by Goss & De Leeuw Machine Co., New Britain, Conn.; also an 11-inch multiple spindle chucking machine. Hand metalworking punches, shears and angle iron machinery are exhibited by Whitney Metal Tool Co., Rockford, Ill., and rotary pumps by Tuthill Pump Co., Chicago. Flexible shaft machinery is exhibited by Biax Flexible Shaft Co., New York.

Automatic Nut-Thread Corp., Philadelphia, brought out a new automatic nut tapping machine at the railroad exhibit in Atlantic City, N. J., this summer, but did not have the opportunity of installing a newly designed hopper attachment. This machine, with attachment, is now being demonstrated and will produce six 1½-inch hot pressed nuts per minute. It will take sizes down to ⅞ inches. Another tapping machine is in operation on ⅝ to ¾-inch nuts.

Pneumatic and electric portable tools, drills, grinders, reamers, screwdrivers and sanders are a feature of the exhibit of Chicago Pneumatic Tool

Co., while a 9 by 9-inch universal metal saw and a 2-inch pipe threading machine are being shown by Peerless Machine Co., Racine, Wis. An automatic toolroom machine, working on milling blanking dies and punches and forming dies from cement masters, is shown by Keller Mechanical Engineering Corp., Brooklyn. The machine is equipped with various attachments, including a double tracer rigging which is a relatively new development. Various machine screw products are being displayed by Hartford Machine Screw Co., Hartford, Conn.

A new line of reduction gear units and speed reducers is being demonstrated by R. D. Nuttall Co., Pittsburgh. Features include single-helical gears, a rigid, 3-section case and a positive splash lubrication system. An impressive display of flat sheet metal work is being shown by Heintz Mfg. Co., Philadelphia. Chain hoists, trolleys and allied products are displayed by Harrington Co., Philadelphia. A 10-inch belt cutter and a new speed lacer are among features of exhibit of Clipper Belt Lacer Co., Grand Rapids, Mich.

A new machine for testing eccentricity, pitch and profile of a tooth of a bevel, helical or spur gear is being demonstrated by R. Y. Ferner Co., Washington.

Progress in Steel Manufacture Is Depicted

PRODUCERS of plain carbon, alloy and high-speed steels made by open-hearth, electric and crucible processes are widely represented at the Exposition. Jones & Laughlin Steel Corp., Pittsburgh, is displaying hot-rolled and cold-finished steel in various shapes, such as bars, light weight channels and beams and a new section of steel piling. The exhibit of Illinois Steel Co., Chicago, includes various products manufactured from its steel consisting of automobile transmission gears, frames, springs, crankshafts, front axles, brake drums, differential gears and pinions, etc. These are attractively arranged in the company's booth.

An early type of automobile equipped with solid rubber tires and built by the Autobug Co., Norwalk, O., about 1900 is attracting considerable attention at the booth of the Central Alloy Steel Corp., Massillon, O. The company also is displaying automobile gears, ball races, universal joint spiders and other automotive parts manufactured from the alloy steels which it produces, as well as stainless irons, heat resisting alloy steels and copper-molybdenum iron. Donner Steel Co., Buffalo, has an attractively arranged display of cold-drawn bars and shapes and various commodities manufactured therefrom.

Cutlery Makes Attractive Display

Carbon and alloy steel sheets for various types of saws and cutlery, magnet, high-speed, agricultural disk and soft center steels is prominently displayed by the Universal Steel Co., Bridgeville, Pa. Sheets and bars of heat resisting and noncorrosive steels and alloys and various finished products also are being shown. Simonds Saw & Steel Co., Fitchburg, Mass., and Lockport, N. Y., has on display at its booth various type saws for cutting wood and metal, machine knives, files, hack saw blades, and special tool, high-speed, magnet and nickel steels.

At the booth of A. Milne & Co. and Edgar Allen Steel Co., New York, a wide range of special steels is seen. The former company is showing drill steels in special sections, electrical iron, ball bearing steels and cutlery, gin and hack saw sheets, and file sections. The latter company has on display various grades of high-speed steel, turning and finishing steels, steels of hardening quality and die casting, tool and drill steels.

The above pictured automobile was built about 1900 *by the Autobug Co., Norwalk, O., and is used by Central Alloy Steel Corp. to show the difference between use of ordinary steel then and alloy steels now*

At the booth of the Carbaloy Co. Inc., a new cutting material developed in the laboratories of General Electric Co. is attracting considerable attention. The new steel in the form of a cutting tool is capable of cutting glass, quenched steels, chilled cast iron, hard rubber and other material too hard to be affected to any extent by tool bits.

A wide variety of tool steels is offered for inspection at various booths. Bethlehem Steel Co., Bethlehem, Pa., has miscellaneous types of tool and stainless steels on display and has an operating exhibit of silico-manganese spring steel. Many interesting types of forgings and castings as well as structural steel sections and miscellaneous finished products illustrating the application of various grades of steel are being shown. Tools and dies that have given unusual production records are prominently displayed at the booth of the Vanadium-Alloys Steel Co., Latrobe, Pa. In addition the company is showing carbon, alloy and high-speed tool steels and a wide variety of typical tools made of tool and high-speed steels. An assembly of fractured samples show the effects of the various treatments.

Miscellaneous grades of tool steels may be examined at the booth of the Colonial Steel Co., Pittsburgh, as well as fractures of heat treated specimens of different grades. Forgings, special steel shapes, axe and razor steels and different processes of manufacturing tool steel also are

Welding tables, carts, tanks and other apparatus feature the booth pictured above

available for inspection. Mounted on a display board at the booth of Jessop Steel Co., Washington, Pa., are samples of cold-rolled strip steel, and exhibits of tool steel dies and stainless steel sheets. Coils of narrow and wide cold-rolled strip steel also are included in the display of this company. High-speed, alloy, carbon tool and special steels such as vanadium, chrome and carbon in the annealed and hardened state may be seen at the booth of Vulcan Crucible Steel Co., Aliquippa, Pa. Comprising the exhibit of Firth-Sterling Steel Co., McKeesport, Pa., are steels made by that company including high-speed, die, drill rod and oil hardened material. Other concerns exhibiting tool steels include the Atlas Steel Corp., Dunkirk, N. Y.; Ziv Steel & Wire Co., Chicago; Darwin & Milner Inc., Cleveland; and Cyclops Steel Co., Titusville, Pa. An automatic machine is shown in operation at the booth of Carpenter Steel Co., Reading, Pa., cutting stainless steel as though it were screw stock. The company also is showing various commodities fabricated from that grade of steel. A high-speed cutter blade, which slices a 0.75 carbon tire steel ingot as cast, is available for inspection at the booth of the Midvale Co., Philadelphia, in addition to hardened and ground forged steel rolls, automobile body dies with tool steel inserts, tool steel tools and dies and stainless steel bars.

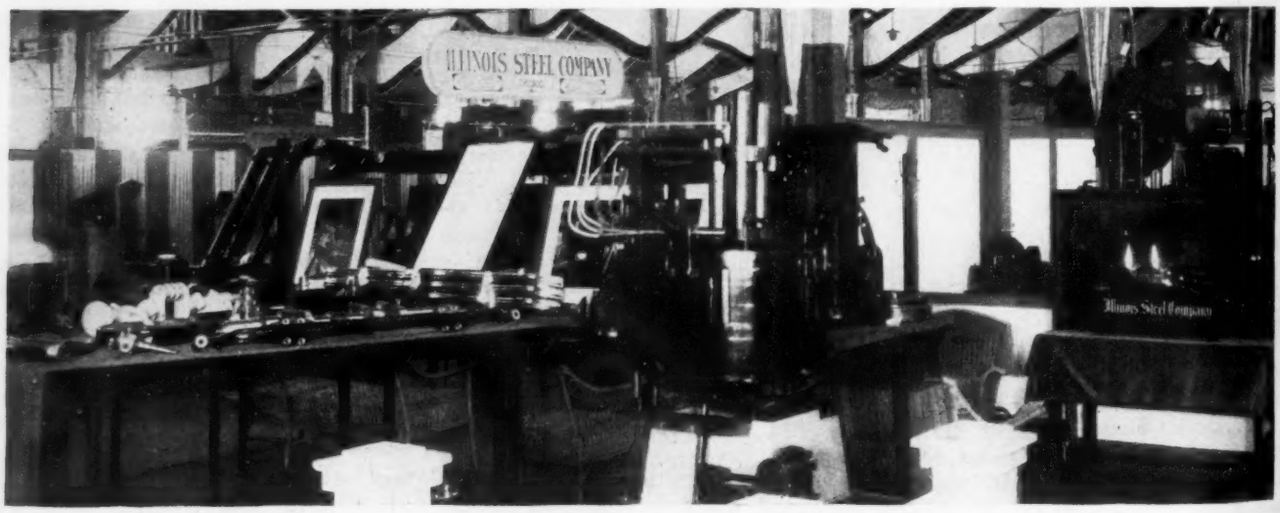
Drop forgings for automobiles and airplanes may be examined at the booth occupied by J. H. Williams & Co., Buffalo. The company also is displaying drop forged wrenches made from alloy and plain carbon steels, clamps, crank handles, eye bolts and hoist hooks made by forging. Endicott Forging & Mfg. Co., Inc., Endicott, N. Y., also is displaying drop forge products.

Shows Ingot Cross Sections

Split ingots are available for observation at the booth of the Heppenstall Forge & Knife Co., Pittsburgh, where also may be seen in operation a shear equipped with knives manufactured by the company. Five split ingots also may be inspected at the booth of Gathmann Engineering Co., Baltimore, as well as molds, shrink head castings and improved methods of steel production.

Various ferroalloys used by the steel industry at large may be viewed at several booths at the exposition. The exhibit of the Vanadium Corp. or America, New York, includes ferrovanadium, silicovanadium, aluminovanadium, ferrochrome, ferrosilicon, etc., and various types of springs and forgings made of alloy steel. International Nickel Co., New York is showing typical applications of nickel and nickel alloys including nickel steel such as roller bearings, spoons and knives, crankshafts and pinions; and nickel cast iron. Samples of plain, nickel and nickel-chrome cast iron are mounted in a display case and are accompanied by data showing the physical properties. Molybdenum ore, its concentrates and the forms in which this material is used by the iron and steel industry is included in the display of the Climax Molybdenum Co., New York. Various types of nitrided steels are being exhibited by the Molybdenum Corp. of America, Pittsburgh.

Forming the background of the display offered by Wheeling Mold & Foundry Co., Wheeling, W. Va. is a section of a chilled iron sheet mill roll, a section of an alloy steel heat treated roll and an alloy steel hammer ram and forging die. In continuous



A model of an electric furnace is prominent in the display of Illinois Steel Co.

operation at the booth of the Timken Steel & Tube Co., Canton, O., is an endless conveyor, 32 feet long, bringing in full view of the spectators numerous models of bottom-poured round corrugated ingots depicting those made by the company at its open-hearth and electric steelworks.

Samples of metal products and sheets, bars, tubes, etc., of high heat resistance as manufactured by the Allegheny Steel Co., Brackenridge, Pa., are shown at its booth. Mounted on display boards at the booth of Keystone Drawn Steel Co., Spring City, Pa. are various sizes of hexagons, flats, rounds and U-shaped sections made by the company.

Instrument Exhibitors Reveal Improvements

SCIENTIFIC apparatus, including physical testing and temperature recording instruments and optical equipment, comprise numerous attractive displays with various refinements noted. Riehle Bros. Testing Machine Co., Philadelphia, is exhibiting a 50,000-pound vertical screw testing machine, of the 3-rotary reversed-screw type, with an automatic transmission gear box as a new feature. A Vickers-type hardness tester, of the deadweight type and with a diamond point for hardness tests, is shown for the first time. Other equipment on display includes an extensometer and a proving ring.

Tinius Testing Machine Co., Philadelphia, is exhibiting in this country for the first time the Herbert-type hardness testing machine and equipment for superhardening steel; also for the first time a tester for brinell hardness. Other equipment includes a universal testing machine for tension, compression and transverse testing and the latest type of direct motor-driven ductility testing machine for sheet metal testing. Equipment for balancing rotating parts and various extensometers also are among the numerous items displayed by this company.

A new type of brinell machine is being displayed by Pittsburgh Instrument & Machine Co., Pittsburgh, which also is demonstrating several other brinell instruments, as well as a sheet metal tester and a metallographic grinding machine. Radiation, optical, immersion and surface pyrometers are being displayed by Pyrometer Instrument Co., New York.

Thwing Instrument Co., Philadelphia, is displaying a new model recording pyrometer, which is identical for use as a thermoelectric pyrometer, electrical resistance thermometer or a radiation pyrometer, also standard thermoelectric pyrometers, including both base metal and platinum thermocouple, inspector's calibrating and checking sets and millivoltmeters, and resistance thermometers.

Indicating and recording high temperature control equipment is a feature of the display of Brown Instrument Co., Philadelphia.

Bristol Co., Waterbury, Conn., has an interesting display. One panel contains temperature control equipment, especially designed for chromeplating, while another shows the front and rear views of a pyrometer controller with case removed, and in operation. A well-rounded line of equipment for controlling electric, gas and oil-fired furnaces, along with special thermocouples designed for heat treating furnaces are shown.

Prize Instruments Shown

The 1929 model of the micrometallograph, which took the grand prize in Paris in 1927, is being demonstrated by E. Leitz Inc., New York. A new magnetic polishing disk, designed to increase the magnetic pull and at the same time rotate the speciman is a feature; also a new speciman holder, which is said to require no cementing or heating and into which a speciman can be mounted in a few seconds.

Several improvements are announced in the metallographic equipment on display by Bausch & Lomb Optical Co., Rochester, N. Y., which also exhibits a contour measuring projector and a wide range of microscopic and photomicrographic equipment. X-ray negatives showing defects in materials are displayed by Eastman Kodak Co., Rochester, N. Y.

Dial-type scleroscope, bulb-type hardness tester, optical pyrometers are included in an attractive operating exhibit of Shore Instrument & Mfg. Co., Jamaica, N. Y.; also rubber testing instruments for hardness and elasticity of plastic materials, local case and local hard compounds and a static test for hardness.

A new indicating controller, with a visible scale the entire width of the instrument, is a feature of the exhibit of Leeds & Northrup Co., Philadelphia. Hardening and tempering furnaces and an extensive line of pyrometers and portable indicators also are on display. Southwark Foundry & Machine Co., Philadelphia, is exhibiting a 60,000-pound testing machine among other equipment. Stanley P. Rockwell Co., Hartford, Conn., is showing metallurgical equipment.

Abrasive and Refractory Lines Are Extensive

ABRASIVE materials are extensively displayed. Carborundum Co. of Niagara Falls, N. Y., is showing a wide line of wheels, polishing grains, abrasive paper and cloth. Globar Corp., Niagara Falls, is featuring its display with the demonstration of a furnace at 2400 degrees Fahr., with a new improved standard terminal design. Carborundum Co. of Perth Amboy, N. J., has a booth devoted to a display of refractory brick and model furnaces.

Several new developments in grinding wheels are being shown by Norton Co., Worcester, Mass. Included are refinements in segmental wheels, a special chuck and a machine designed especially for high-speed work. Refractory ware, consisting of heat treating furnace tile and hearths, baffle bricks and supports, and other shapes, also are shown.

Grinding wheels are being demonstrated on a 16-inch swing frame grinder running at high speed by Abrasive Co., Philadelphia. Segments, bricks and stones are exhibited.

Chrome, magnesite and silica refractories and many varieties of chrome ores from all parts of the world, in both the crude and ground form, are included in an impressive exhibit by E. J. Lavino & Co., Philadelphia. Multibond refractory cement; a chemically neutral aggregate for monolithic construction; a prepared chrome product ready for molding in place; and photographs, drawings and other data, are displayed.

A new electrically fused nonspalling magnesite brick is a feature of the exhibit of Electro Refractories Corp., Buffalo, which also is showing silicon-carbide brick and a high-temperature cement. A full line of refractories is shown by Lava Crucible Co. of Pittsburgh, Pittsburgh.

Demonstration of chemicals used in

Abrasive wheels and materials dominate the display of the Norton Co.

the cleaning of metals prior to finishing operations is being made by J. B. Ford Co., Wyandotte, Mich. Chemically compounded rust preventives and powdered and liquid cleaners are being exhibited by Dearborn Chemical Co., Chicago.

Temple university, department of metallurgy, Philadelphia, has an interesting exhibit, containing data, examples and photographs descriptive of the lecture and laboratory courses in metallography and heat treatment. A feature is the architect's model for the university's proposed 27-story undergraduates' departmental building now in course of construction.

Demanding no little attention is the exhibit of E. F. Houghton & Co., Philadelphia, wherein is depicted a modern heat treating laboratory, which in turn is contrasted with physical laboratory equipment of an allegorical age. In addition, the company is displaying its complete line of metal-working products, including carburizing materials, quenching oils, salts, leather belting, leather packings, rust preventives and lubricating oils. A screening machine for cleaning and grading carburizing compound is shown by Brown Lynch Scott Co., Monmouth, Ill. Keystone Lubricating Co., Philadelphia, exhibits a pneumatic safety lubricating system.

Miscellaneous Steel Castings Are Displayed

STEEL castings are interestingly displayed at the exhibit conducted by the Electric Steel Founders Research group, Chicago. Companies associated with this group include the Sivyer Steel Casting Co., Milwaukee; Nugent Steel Castings Co., Chicago; Michigan Steel Casting Co., Detroit; Lebanon Steel Foundry, Lebanon, Pa.; and Fort Pitt Steel Casting Co., Pittsburgh. Photographs of the plants of the various companies co-operating with this group are shown. Starting at one end of the group's booths and terminating at the other end is an assortment of photographs which show in sequence various operations involved in the manufacture of steel castings.

Arranged in an orderly manner on display tables are samples showing the class and types of castings produced by the member concerns. This display includes over 60 pieces ranging from ½ to 500 pounds. The observer also may view various kinds of apparatus for testing sands, a machine for testing cores after baking, a machine for determining the bond strength of green sands, a ramming device for preparing the test pieces, apparatus for testing the permeability of sand and a machine for testing the bond of various grades of sand. On display are castings of alloy steel normalized and drawn, showing the physical qualities. Specimens of different alloy steels and their fractures are shown in test sample form.

Exhibit Products Jointly

The Steel Casting Development bureau, Philadelphia, also has an attractive exhibit of steel castings developed by carefully controlled heat treatment including heavy coil springs, rack and pinions, herringbone gears, tractor shoes and an automobile truck rear end housing. Various panels illustrate normal, annealed and heat treated structures of plain carbon and special alloys steels. An additional display of physical test specimens and photomicrographs is found at this booth. Companies co-operating with the bureau include: the Gray Iron institute, Cleveland; Atlantic Steel Castings Co., Chester, Pa.; Pennsylvania Electric Steel Casting Co., Hamburg, Pa.; Empire Steel Casting Co., Reading, Pa.; Dodge Steel Co., Philadelphia; Deemer Steel Casting Co., New Castle, Pa.; and Crucible Steel Castings Co., Lansdowne, Pa.

Various fittings and other appliances used in conveying acid liquors or in acid atmospheres and made from acid-resisting material by the Duriron Co., Dayton, O., are displayed at this company's booth. The exhibit includes tank outlets; plug and gate valves; a pump connected for belt drive, an ejector; split, flanged, bell and spigot pipe; a sink outlet with strainers; an exhaust fan connected with a motor; etching trays; gage glass fittings; pickling baskets; rods, bolts, nuts, washers, etc.; and a circulating steam jet.

Centrifugally cast bronze in various sizes, lengths and forms are made of standard and special compositions in the rough, semifinished and finished state can be inspected at the booth of the Shenango-Penn Mold Co., Dover, O. The product shown varies in weight for each piece from 1 to 1000 pounds and is in the form of solids, tubes, bushings, sleeves and liners. Solids and tubes are shown in the rough state while the bushings, sleeves and liners are displayed both in the rough, semifinished and finished form. American Manganese Bronze Co., Philadelphia, is showing various specimens of manganese bronze castings. Brass, copper and bronze tubing, rods, forgings, castings and fittings are displayed at the booth of the Mueller Brass Co., Port Huron, Mich. Heat resisting castings are

(*Concluded on Page* 917)

Large Uses of Steel in Small Ways

Newspaper Vending Boxes ***126th Article***

THE automobile industry has no copyright on the "two-to-a-family idea." Newspaper vending boxes are being placed in thousands of convenient corners, especially along street car and bus routes in the residential sections of cities, to make merchandising easy. The theory is, and this theory has been found to work in practice, that John Jones in starting to work in the morning leaves the copy of the newspaper that has been delivered to his home for his wife to read, while he buys an extra copy at the corner, before getting on the bus or street car. The result has been that in a few short years more than 50,000 newspaper boxes have made their appearance, according to a conservative estimate, and they are now being erected more rapidly than ever. The boxes formerly were made of wood, but steel has been found to be a more durable material, and practically all the boxes now are made of steel. Good "side line" industries have been established for their manufacture.

A common type of such a box is 19 inches long, 6 inches wide, 14 inches high in the back and 7 inches high in front. The box weighs approximately 10 pounds, which indicates that about 250 tons of steel has been consumed in their manufacture. The best of the boxes do not last long, not over a year, while many of them are broken and scrapped, or in need of repairs in a few weeks or months. They are not damaged so much by the action of the elements as they are through vandalism. In replacements and the manufacture of new boxes it is estimated that 125 tons of steel is consumed annually.

This type of box is made of 20-gage, one-pass cold-rolled black sheets. The back, bottom and front is fashioned from one piece. Each side is a separate piece. The three pieces are held together by double seams. A comparatively recent development is a bracket, made of steel ⅛-inch thick and about 1 inch wide, welded on the front of the box. A newspaper is folded so that the name and main headlines are exposed to view and slipped into the bracket. A canvas flap is riveted to the top of the box and hangs down over the opening to protect the newspaper within. A piece of steel about ⅛ x 1 inch and 19 inches long is slipped in the outer hem of the canvas to hold it down.

The locking device of the box presented a problem to manufacturers, and one that has not yet been fully solved. A receptacle for the pennies, usually made of a length of steel pipe, or a piece of steel bent into an angle, is welded inside the front of the box, and a cap with a slot punched in it, is welded into the top of the money box. Formerly a hasp, staple and padlock were used, but these were exposed on the outside of the box. They were "jimmied" too often, and the padlock as well as the money stolen, so the manufacturers exercised more ingenuity. Now a steel tube is made to slip into the tube that is welded to the box At the bottom, the two tubes have holes through them, and the ring of the padlock is slipped through them. The man who "jimmies" the lock now must be double jointed, and be possessed of more strength than that of the average penny-box pilferer.

Another type of newspaper receptacle is rapidly making its appearance along interurban roads and rural delivery routes. This is a tube into which the newspaper is slipped. These boxes are 15 inches long, and 5 inches diameter. They are made of 20-gage one-pass cold-rolled black sheets. The outer edges are either crimped or turned over wire, to impart strength to the cylinder. Such a box weighs 2½ pounds, and it is estimated that about 60 tons of steel is used in their manufacture. These tubes sell at wholesale for around 20 cents, while the larger boxes are sold for about $2 each.

Steel posts, in the form of angles, are being used extensively for the boxes and cylinders. The number in use is difficult to estimate. One manufacturer makes a conservative estimate of 500 tons annually, used in the manufacture of newspaper receptacles of the two types described, and the posts.

THIS is the one-hundred twenty-sixth of a series of articles dealing with some of the obscure uses of steel which go far toward absorbing the American tonnage.

Among articles appearing every two weeks and not included in Vol. I containing 51 separate descriptions are:

Swords	*Bathroom Fixtures*
Paving Guards	*Snow Fences*
Reaction Kettles	*Stairs*
Fire Screens	*Cork Screws*
Voting Machines	*Universal Shafts*
Display Racks	*Sewing Machines*
Steel Stamps	*Lanterns*
Wire Screens	*Cleats*
Typewriter Spools	*Axes*
Chain Hoists	*Steel Ceilings*

Canada Increases Power

With the completion of the transmission line 226 miles in length from the plant of the Gatineau Power Co., on the Ottawa river to Toronto the Ontario hydroelectric power commission has an additional 80,000 horsepower of electrical energy at its disposal. The distributing station at Leaside, a suburb of Toronto, was formally opened Oct. 1 by Premier Ferguson and the current turned on. The ultimate amount called for by the contract is 260,000 horsepower, which is likely to be speedily absorbed owing to steadily increasing demand.

Tungsten Carbide—New Cutting Tool Material—Scratches Sapphire

By Samuel L. Hoyt

GERMAN investigators have been particularly active in developing the tungsten carbide and cobalt combination. By means of cobalt, tungsten carbide is made about half as strong as high speed steel, while retaining sapphire-scratching hardness. Various forms of carbide tool materials have been studied by the General Electric Co., in its research laboratory and in its shops.

The density of this material runs 14 grams per cubic centimeter and above, depending on the amount of cobalt used. This characterizes it as a heavy metal, almost of the tungsten class. It does not tarnish and, when ground, resembles metals of the steel class in appearance. It resists chemical attack remarkably well and is a pleasing and satisfactory material for use in the arts.

Its hardness can be given in a number of ways. Sapphire is the mineral which comes next below the diamond in hardness. This new material is capable of producing a well-defined scratch in the natural sapphire. When it is borne in mind that the sapphire has an "absolute hardness" of 1150 kilograms per square millimeter, and that a mineral which is as hard as feldspar has an "absolute hardness" of 300, the hardness of this new material receives new significance. A sample specimen ground to an edge of about 90 degrees is capable of cutting a rather deep, narrow, groove in an alundum wheel without suffering much loss itself; whereas our ordinary tool materials are worn away by the alundum wheel.

H. O'Neil has shown that the brinell number of the hardest steel may be taken as about 1000, using a diamond ball point as the penetrator. Common hardened tool steel probably runs closer to 850 as a maximum. The brinell number of the original German material runs from 1250 to 1400, so that it represents a material increase over the hardest steel. This new alloy runs from 2100 to 2500. The Rockwell "A" numbers for these two materials run 85 to 87 for the German and 90.5 to 91.5 for the new material.

Dr. Hoyt holding tungsten-carbon cutters in right hand

Inasmuch as the strengthening of tungsten carbide has been the feature which has given these materials promise of industrial use, this property has more than common interest. A. H. D'Arcambal has shown that quenched and tempered high speed steel has a modulus of rupture in a transverse or cross-bending test of around 425,000 pounds per square inch. Similar tests have been run on tungsten carbide tool material at our laboratory, using a section, ¼-inch square with supports 1½ inches apart. The German material is found to run around 225,000, while our material runs around 250,000 to 275,000 pounds per square inch.

Another important property of a material of this type may be called "toughness" (the ability of a material to stand up under stresses or impacts imposed on relatively small areas). A weak, or fragile, material would chip and flake off, but a tough one would be able to stand stresses of this type without injury. This material possesses its share of toughness, since it withstands severe blows of a soft peen delivered on the edge of a bar. The blows are delivered in such a way that the edge would crumble if it were weak. A supporting block of copper shows marked indentations as a result of the blows on the material. Inasmuch as the break comes abruptly when the bar does break, the material may be called brittle in that sense. The fracture is of the curved type, while a weaker, or less "tough," material would break straight across. A further demonstration of the strength and toughness of the material is afforded by intermittent cuts on metals.

The material does not pit or tarnish, and is dissolved in acids only with great difficulty. In many respects it may be expected to show somewhat similar properties and behavior to tungsten. At elevated temperatures the carbon oxidizes, as other tungsten products do when heated in an oxidizing atmosphere. On this account the various operations which are performed on the alloy at high temperatures are carried out under nonoxidizing conditions. The moderate temperatures involved in cutting metals at the speeds which we generally use have not been observed to be harmful. If the speed is raised too high and the abrasion is severe, small particles of carbide may oxidize and shoot off the edge as sparks. Ordinarily, the temperatures involved simply produce temper colors, much the same as they do on high speed steel.

Work at the research laboratory has been largely devoted to a study of the performance of this material as a tool material. Early in the work it became of interest to determine the breakdown point as one means of estimating the economic value of the tools and, particularly, to compare it in this respect to the tool materials with which it would have to compete.

Glass proved to be easy to machine, or to cut with screw threads; and we found that hard porcelain insulators could be machined on a shaper. Hadfield's manganese steel was found to yield easily to this new tool material, so easily, in fact, that it would seem that the operation could be developed commercially. For a check on the tungsten carbide material tests, we then tried a standard steel tool on the same material, and found that it lost its edge almost at once, as was to be expected. Since then we have found these carbide tools to be of great assistance in handling many of

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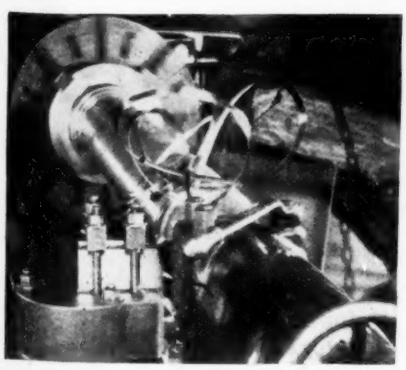
Abstract from a paper presented before the meeting of the American Society for Steel Treating, Philadelphia, Oct. 11. Released for publication by special permission. The author is with the research laboratories of the General Electric Co., Schenectady, N. Y.

these hard, tough, and nonmachinable steels.

In the "low tensile" field the durability of the tungsten carbide tools has been found to be of 25 to 75 times that of high speed tools. Here the tool pressure is always light, the cuts are small, and the cutting speeds are high. Resistance to either wear or "burning" is the chief requirement of the tool. Coming to cast iron we find that the cutting conditions are apt to be radically different. The parts are frequently large, the cutting speeds are much lower, the cuts are heavier, and the tool pressures are greater. The heavier pressures are due in part to the higher unit pressures exerted by the iron, but more particularly to the larger cuts. In this way the tool pressure becomes a more prominent factor in tool performance, but our experience shows that cast iron comes well within the field which can be handled by this new material.

A somewhat similar problem is presented by "hard" castings. If a machine shop is accustomed to machining castings of some particular grade, a run of castings which is appreciably harder is certain to increase the machining costs whether the increase be due to annealing, to a lower production rate, or to scrapped castings and lost time. These castings may be, and quite likely are of a better grade than the softer castings with which the shop is accustomed to deal. From that point of view it is unfortunate that they cannot be satisfactorily and economically handled. Tungsten carbide tools machine these "hard" castings with ease, and it has been our experience that a run of such castings will go through the machine shop without disturbing the practice in any way. Naturally, the tool life is diminished according to the increased abrasion of the harder iron, but the tool life of this new material on cast iron is normally so great, that the decrease involved is not a serious matter.



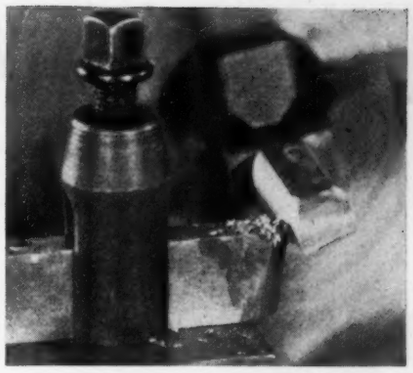
Long turnings from nickel steel cut by tungsten-carbide tool

Not much can be said at this time on the use of this material as a finishing tool on cast iron for, obviously, this will require a special study. In tests, the author has observed that a speed of 300 feet per minute is sufficiently high to take the edge off high speed steel and other tools almost at once. In fact, in one such test the cast iron acted more like a grinding wheel and wore off the tool as rapidly as it was fed into the work. The carbide tool used in a parallel test was ground to a rather keen edge and was able to take a light cut for over a foot in length along a block about 6 inches diameter with no appreciable wear on the edge. This test suggested that cast iron is more abrasive at high speeds.

At one time a series of tests was run on a nickel steel test log, the Taylor speed of which was about 54 feet per minute under standard conditions for testing high speed steel. We soon found that if we were to get any adequate estimate of the life of

After using cutters on nickel steel—tungsten-carbide above; high speed steel below

carbide tools on this log, we would have to increase the speed to around 200 feet per minute. The calculated tool life came under 30 seconds, while the tool on test failed in 16 seconds, having had its edge burnt off almost at once. The tungsten carbide tool was then set up in the same way, and after running for one hour, the test was arbitrarily stopped for the tool was still cutting and capable of cutting for a much longer period. The difficulties involved in determining the tool life of these carbide tools may well be imagined from the results of this test. In fact, they are so great that we do not commonly run the tools to failure but stop the test at some predetermined point and inspect the tool edge to see how it has worn. One of our test logs is a chromium-nickel steel with a brinell hardness number of just over 250. With a cut of ⅜-inch and feed of ⅛-inch we find that good high speed tools fail at 35 feet per minute



Cutting high speed steel in lathe with tungsten-carbide

in about 6 to 8 minutes. We run the carbide tools with the same cut and feed, but at 70 feet per minute, and stop the test at 10 minutes and the tools show only slight wear.

In this work on steel we have carried the thought in mind that the principal factor limiting the performance of carbide tools is the strength of the material. This is predicated on the use of the proper tool shape, cutting angles, sizes of tool, etc. To test out this viewpoint we ran a series of tests to determine the proper ratio between the chip cross section and tool section. These tests showed that normal service may be expected if the chip area is of the order of 1 per cent of the tool area. Expressed otherwise, we may expect good service from tungsten carbide tools on steel if a sufficiently large tool be used for the job at hand, provided that the feed be not too fast. This, in turn, will vary with the steel machined, so that definite recommendations could be given only for specific cases.

This account of this tungsten carbide-cobalt alloy has shown that the use of tungsten carbide as a tool material has increased the cutting ability of the tool by a whole order of magnitude. This is the first time this has been done since the introduction of high speed steel by Taylor and White. Granting this improvement in cutting ability, the extent of the use of tungsten carbide will depend largely on the cost of operating with such tools and their output, as compared to that of high speed steel. The ingredients of carbide alloy and the process of making it are expensive so that we may safely say that it will cost more than high speed steel; but we have found by an extended study of many fields that the improved performance of such tools more than offsets their greater cost. In these cases our shops find that they cannot afford, now, to operate without the carbide tools.

How Modern Machinery Saves Labor, Speeds Output

Typical Example Shows Production Gain of 672 Per Cent, with Employment Increase of Only 175 Per Cent in Three Years

By Herbert R. Simonds

SOME years ago when the New York subways started to put in automatic fare collecting machines a great protest arose among the employes. Because of this labor-saving device the services of thousands of men would not be needed. A strike to force the retention of the old method was narrowly averted.

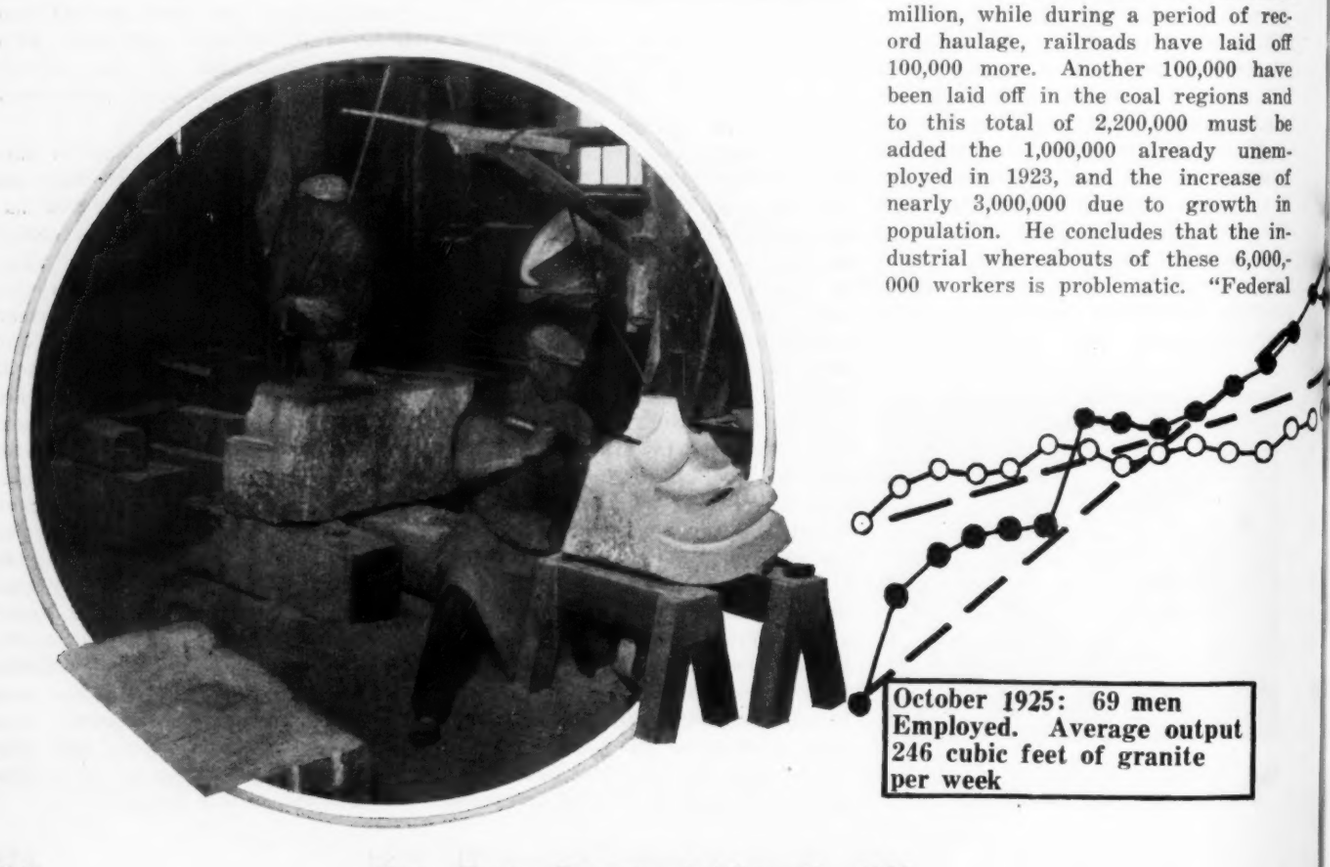
Such progress nearly always has met with opposition, and it is only natural that many throughout the country should fail to appreciate the great strides being made in development of automatic and semiautomatic machinery. To attempt to halt this progress is to invite stagnation or retrogression, and is almost unthinkable to the modern scientific mind.

The complexity of modern life makes it difficult to put a finger on the actual cause of these disturbances, but the solution is to be found in labor-saving machinery. A recent editorial in IRON TRADE REVIEW comments on this: "It would be impossible to make the processes of production too automatic. If they could be made completely automatic, so much the better for everyone. The more rapid the adoption of labor-saving machinery, the more quickly can industry bring about further general reduction in the hours of labor. The eight-hour day is no more sacrosanct than was the 12-hour day. As fast as machines can be developed to do the work, men are entitled to greater leisure. This in itself increases both consumption and employment."

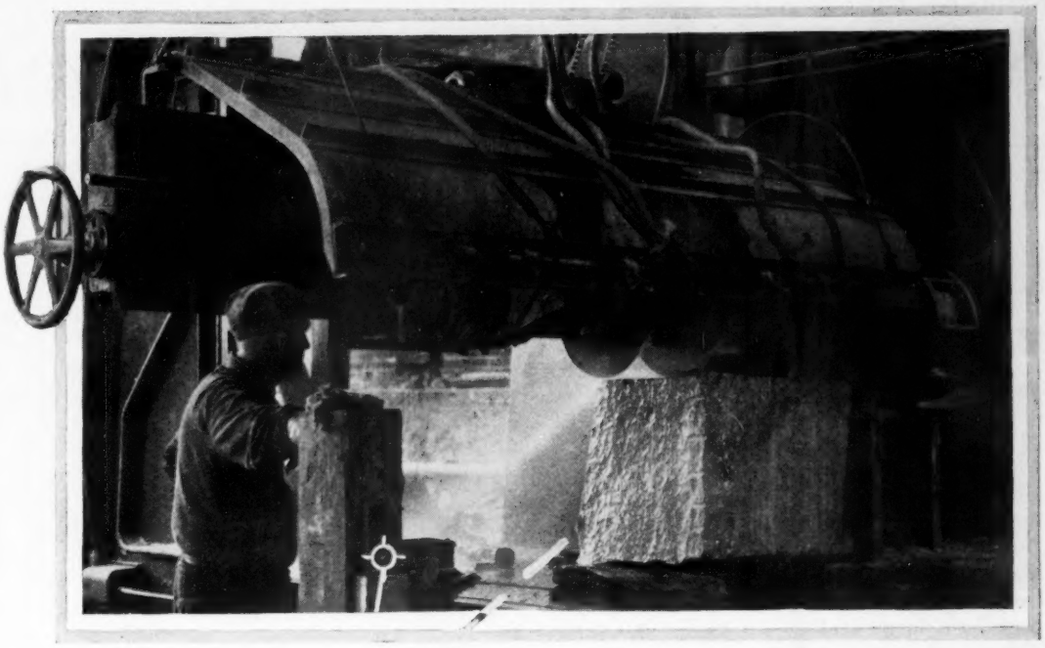
James J. Davis, secretary of labor, aroused a good deal of comment some time ago by his suggesting a curtailment in the use of labor-saving machinery to prevent further unemployment. Secretary Davis deplores the fact that the needs of the country can now be supplied by fewer men than formerly. He said: "It now should take 140 men to supply the needs where 100 men can do so. In spite of our having 20,000,000 more people, the needs of the country are fully supplied with 7 per cent fewer workers than we needed in 1919. What is the meaning of this? Labor-saving machinery has brought it about."

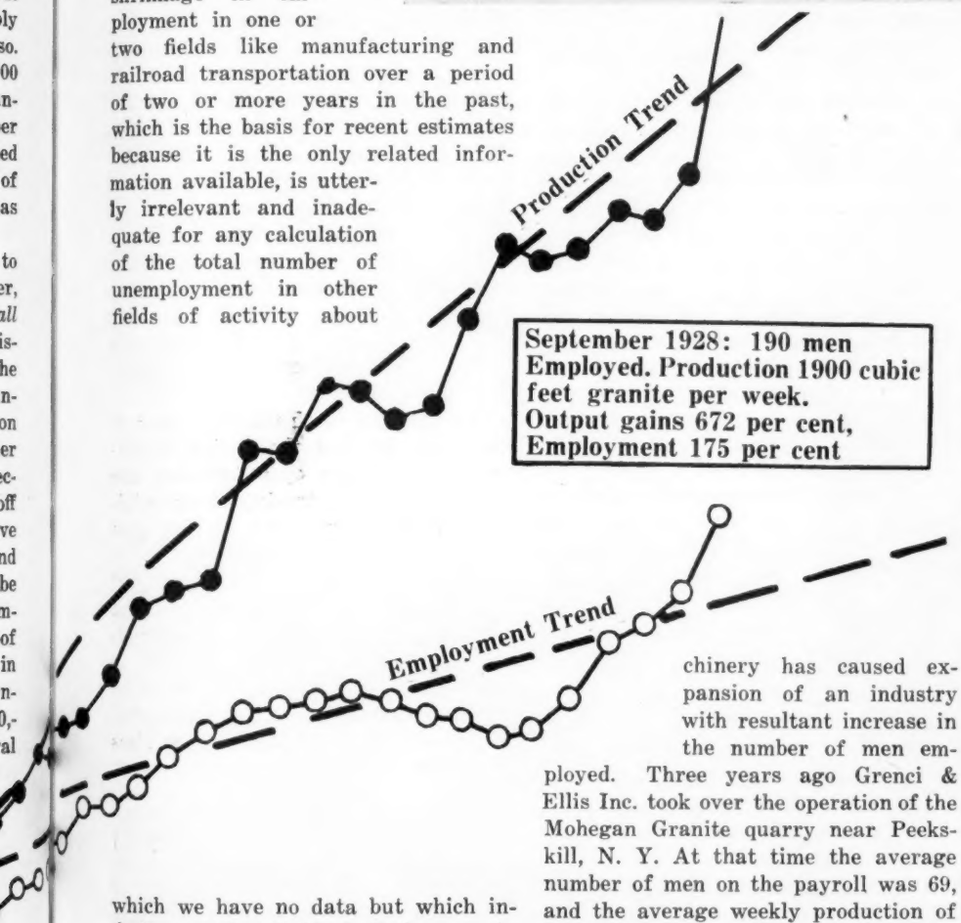
Many industrialists have hurried to reply to Mr. Davis. Irving Fisher, writing in the *Magazine of Wall Street*, gives some interesting statistics. He finds that since 1923 the manufacturing industries of this country have dispensed with a million workers and the farms with another million, while during a period of record haulage, railroads have laid off 100,000 more. Another 100,000 have been laid off in the coal regions and to this total of 2,200,000 must be added the 1,000,000 already unemployed in 1923, and the increase of nearly 3,000,000 due to growth in population. He concludes that the industrial whereabouts of these 6,000,000 workers is problematic. "Federal

Actual trend lines of employment and production, following the installation of modern mechanical equipment in a granite-working establishment



Reserve board figures indicate that between 1919 and 1926 the output per worker increased by 34 per cent in factory production," he says. 'The rapid mechanization of industry and better management methods have temporarily displaced men faster than new jobs could be created for them." Magnus W. Alexander, president, National Industrial Conference board, in commenting on this same subject says: "A shrinkage in employment in one or two fields like manufacturing and railroad transportation over a period of two or more years in the past, which is the basis for recent estimates because it is the only related information available, is utterly irrelevant and inadequate for any calculation of the total number of unemployment in other fields of activity about which we have no data but which include more than half of all those working for wages or salaries. While the number of workers required to turn out a certain amount of production has been relatively declining for years there is also evidence that the number of workers engaged in distribution, trade and service has been constantly increasing."





September 1928: 190 men Employed. Production 1900 cubic feet granite per week. Output gains 672 per cent, Employment 175 per cent

In the midst of this more or less theoretical discussion, it is interesting to turn to a definite case where the introduction of labor-saving machinery has caused expansion of an industry with resultant increase in the number of men employed. Three years ago Grenci & Ellis Inc. took over the operation of the Mohegan Granite quarry near Peekskill, N. Y. At that time the average number of men on the payroll was 69, and the average weekly production of granite was 246 cubic feet. As rapidly as possible, labor-saving machinery was installed and the production per man increased, the actual production in increased, the actual production in cubic feet increased, and the number of men employed increased.

The increases were possible because of modern machinery, according to William F. Ellis, treasurer, who is also a student of labor problems. Today production of the quarry averages 1900 cubic feet or nearly eight times the production of three years ago. The average number on the pay roll at present is about 190, or a little less than three times the number employed three years ago. The gradual progress in production and number of men is shown by the accompanying chart.

In 1925 the company purchased five high-speed carborundum machines, several rotary saws and suitable cranes. The change in equipment involved increasing the generator capacity from 100 horsepower to 500 horsepower. As a direct result of having the equipment, as well as the proper grade of granite, the company was able to obtain a million dollar contract for a large building in New York.

Machinery Does Much

The entire property including the quarry, the various cutting sheds and the power plant has been organized on an efficient production basis. Wherever a man's job could be replaced with machinery the change has been made. At present the equipment includes two rotary saws, one with three motors having a total capacity of 90 horsepower, and the other with two motors with a total of 40 horsepower. A carborundum edger is operated by a 62-horsepower motor and two other edgers are operated by 27-horsepower motors. The cutting sheds are served by five overhead cranes, one of 20 tons capacity with a 40-horsepower motor, and the others with 20-horsepower motors. Compressed air, electricity and water are required in the operation of granite-working machinery. At present three compressors, and several pumps are in operation.

Sets New Standard for Preparation of Coal at Lake Dock

By N. L. Davis

A UNIQUE solution of a difficult problem is set forth in the following description of the design of the new coal dock of the Zenith Furnace Co. at Duluth, Minn. The dock is operated in connection with the new by-product coke ovens and blast furnaces of the company. In addition to furnishing the cities of Duluth and Superior with gas, and manufacturing a high grade of pig iron, the company operates a coal dock on a large scale.

Proper coking mixtures require three or four different kinds of the highest grade coals, which must be kept separate in all the handling, up to the final mixture delivered to the oven. The coal comes to the dock as mine-run, and is delivered to separate piles by bridge tramways.

The problem was to secure the most effective, yet simplest method of removing the slack for use in the coke ovens, and sizing the balance for domestic sale; thus making the equivalent of a mine tipple preparation of the coal, right on the dock. The domestic sizes find a ready market.

The handling of coal from boats to storage is accomplished with two bridge tramways of the man-trolley type, having a span of 375 feet, and equipped with 10-ton capacity buckets for free digging, and a cleanup bucket with 24-foot spread. The trolley travel, bridge traverse, and all bucket functions, are electrically operated and controlled.

The aim was to equal mine preparation for the domestic coals, and to minimize the number of times the coal must be handled. Consideration of several plans resulted in the choice of what is basically a coal tipple that can travel on its own tracks the full length of the dock, and be fed by either of the two bridges; each bridge being equipped with a dock return conveyor, to receive and restock the coal not loaded from the screening plant. Either bridge when not in use with the screening plant is available for unloading cargoes or rehandling coal or coke on the dock.

It was decided to design the tipple structure flexibly, to permit travel over rock ballasted tracks. Wheel loads were reduced to comply with A. R. A. specifications, and reasonable limits were established for track variations in grade and gage.

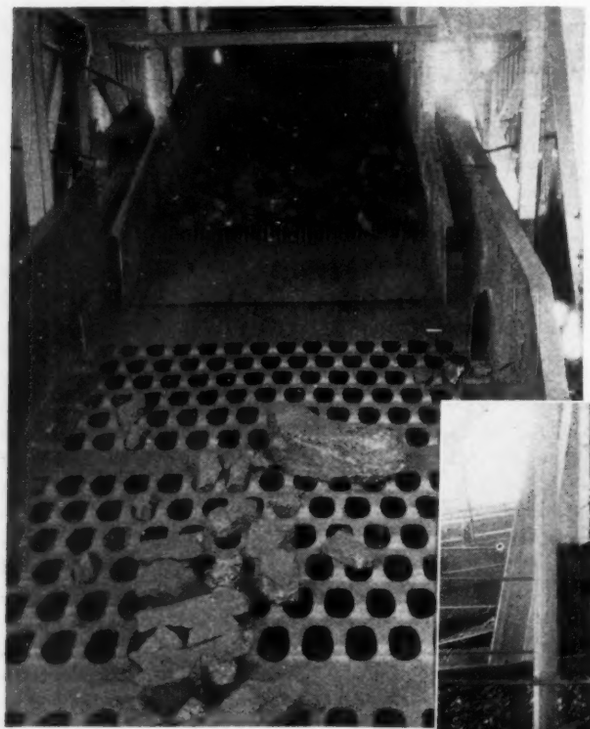
The prepared sizes, or their mixtures, are loaded into either box or open top cars without the aid of chutes. The greatest drop from the time the coal leaves the screens until it is loaded, is not more than 8 inches, and its greatest velocity is 150 feet per minute except when box cars are being loaded. Then the greatest velocity is equal to the speed of the box car loader belt.

Coal is loaded over four tracks simultaneously, when desired. Each track, except the dock track, is served with individual car pullers. Each car puller has a capacity of 4 loaded cars during cold weather, or a greater number in warmer weather.

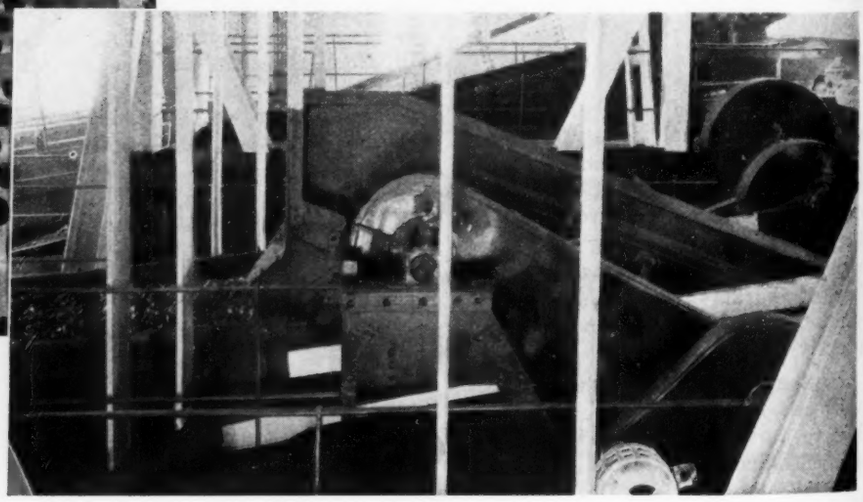
One operator, with the assistance of one oiler, handles the entire screening plant. When open top cars are loaded on three tracks, three additional men are required; or five men when box cars are being loaded.

Coal is prepared at the rate of 500 tons per hour. If the percentage of slack or the smaller sizes in the run-of-pile coal is excessive, the feed to screens can be increased, to maintain full loading capacity of the prepared sizes; the excess of the smaller sizes being automatically returned to dock

The author is engineer, with the Link-Belt Co., Chicago.



Apron feeder delivers to disk grizzly and lump and egg screens. Below is a view through screening plant. Stove and nut screens in foreground

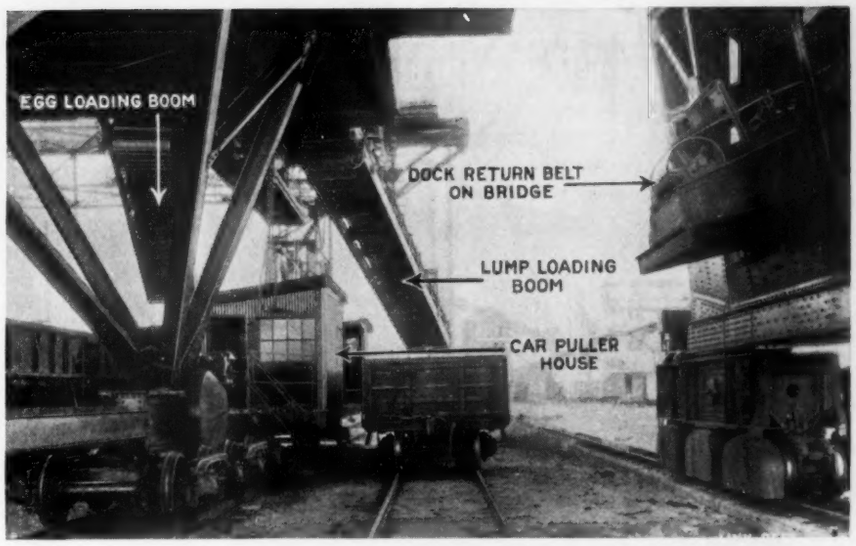


storage, thus eliminating the possibility of "flooding" any part of the system. Conversely, if slack is deficient, the feed can be reduced, to prevent overloading the screens.

Through this new equipment, Zenith Furnace Co. now is able to equal mine preparation of coal for their dock shipments, and at the same time supply the coke ovens, although there are 23 different operating combinations required of this plant. The construction is so simple that all the combinations are controlled by six push buttons and four knife switches, augmented by three gates when coal mixtures are wanted.

Officials of the Zenith Furnace Co. who were instrumental in laying out and building this dock improvement were: William B. Castle, president; C. O. Applehagen, vice president, and manager of sales; H. A. Brady, general manager; H. G. Glenn, general superintendent; and Fred Johnson, dock superintendent. The entire project was engineered by Arthur G. McKee & Co., Cleveland, under the supervision of Arthur G. McKee and C. B. Thorne. The field representatives for the engineers were Messrs. Moehr and Loftus. The Industrial Brown-Hoist Co. designed and fabricated the bridge tramways, and the American Bridge Co. did the field work for them. Link-Belt Co. designed, fabricated and erected the screening and loading plant.

Louisiana produces more than half the carbon black manufactured in the United States from natural gas.



Egg and lump loading booms, with car puller house, in preparation plant (at left); and end of dock return belt conveyor on bridge structure (at right)

Many Heat Treated Steel Castings Displayed

(*Concluded from Page* 910)

shown by Driver-Harris Co., Harrison, N. J., and Chrobaltic Tool Co., Detroit. High temperature alloy castings, such as carburizing boxes, pots, baskets, retorts, furnace rails, plates and trays are included in the display of the Michigan Steel Casting Co., Detroit.

A miscellaneous assortment of heat treating equipment is found at the booth of the Chicago Steel Foundry Co., Chicago. Included in this exhibit are carburizing boxes, grids and pusher plates; salt, lead and cyanide pots; furnace parts, retorts, camshaft annealing tubes, oil burner parts, chain and miscellaneous heat-resisting castings.

One of the features at the exhibit of the Southern Manganese Steel Co., St. Louis, is a noncooled shaft and disks for a normalizing and annealing sheet mill furnace for installation at a continuous sheet mill recently completed. The furnace in which this is to be installed has a 3½-foot hearth and will require 40 similar shafts and an average of four or five disks per shaft. The company also is showing carburizing pots and castings for enameling and roaster furnaces, oil burners, oil cracking still, etc.; and an assortment of heat and corrosion-resistant alloys in the chrome-nickel series.

Alloy castings, such as grids, retorts, cyanide and lead pots and other heat treating equipment; castings used in furnace construction; heating machines; and, oil burners are on display at the booth of the Electro Alloys Co., Elyria, O. Samples of die castings, which have been polished and plated to disclose the application of this art and various assemblies of die castings used in the metalworking industries such as fractional horsepower motors, drink mixing machines, bearings, pulleys, radiator caps, etc., are available for inspection at the booth of the Milwaukee Die Casting Co., Milwaukee. Millbury Steel Foundry Co., Millbury, Mass., is displaying various type castings such as pinions, a large tee, wheels, hot air registers, etc. Castings, bar stock, dies, gages and welding rods are displayed by the Kinite Corp., Milwaukee.

Bridge tramway delivers run-of-pile coal to hopper in screening plant

View of Alcala and Gran Via, principal thoroughfares of Madrid

THIS is the second and concluding article by Vincent Delport, European manager, IRON TRADE REVIEW, describing Spain's mineral resources and iron and steel industry. The first was published in the Oct. 4 issue, beginning on page 829. The European Foundry congress was held in Barcelona in April, and the British Iron and Steel Institute met in Bilbao, in September, this year, when unusual opportunities were afforded the visitors to inspect the industry. The two articles are comprehensive and authoritative.

Spain Builds Flourishing Industry on Own Mineral Resources

Manufactures Comprehensive Range of Iron and Steel Products, First in Country's Value—A Description of the Companies

By Vincent Delport

European Manager, Iron Trade Review

POSSESSING a natural supply of the indispensable raw materials, Spain has developed an iron and steel industry which to a large extent makes her independent of foreign supplies. The annual output is comparatively small, but tends to increase, especially as the works of the Compania Siderurgica del Mediterraneo at Sagunto are nearing completion. The time is approaching when Spain may become self-supporting, except for a number of specialties. Table VII shows the figures of iron and steel production and imports since 1919. Exports are negligible; on the other hand, the Spanish market for foreign products is strictly limited. The Spanish iron and steel industry is a domestic industry. It ranks first in value among the fabricating industries in that country, and second, after coal, in the mineral and metallurgical industries.

In 1926 the iron and steel works employed 23,000 to 25,000 men, and used about 175,000 horsepower, of which about 100,000 was derived from electric power. The principal centers of production, shown in Table VIII, are the provinces of Vizcaya, Valencia, Oviedo and Santander. The Vizcaya works are exceptionally well situated, being in the proximity of ore and coal, and with easy access to the sea. The Valencia works are well located for iron ore, and also occupy a favorable position on the coast. The Oviedo works were among the first to be erected in the country, at a time when the consumption of coal was considerably larger than at present. They were built near the coal and iron ore deposits. Transportation, however, is not so good as for the works situated by the sea. The Santander works have a good supply of rubio ore, but obtain their fuel over long distances. Generally speaking, the country lends itself to an expansion of iron and steel industries, especially those located near the sea.

Table VII

Production and Imports

(Metric tons)

	Production		Iron and steel	
	Pig iron	Steel*	Imports†	Exports†
1919	294,167	241,189	.....	.....
1920	251,412	.....	154,032	18,457
1921	347,497	306,258	226,844	3,251
1922	209,792	314,315	159,510	9,166
1923	400,270	475,696	168,360	6,626
1924	497,390	545,083	174,659	26,704
1925	528,237	630,441	175,165	7,187
1926	486,846	613,604	114,649	1,684
1927	611,778	664,190	167,000	7,019

*Mainly steel ingots with a small proportion of puddled iron; the later years include steel castings.

†Includes iron and steel products of all denominations, scrap excluded.

Table VIII shows that in 1926 there were 18 blast furnace stacks in operation. A few of the furnaces are of small capacity, from 50 to 70 tons per day, but the greater number range from 120 to 450 tons per day. The output is largely used in the works for making steel. Only about 10 per cent of the output of pig iron is melted in the foundries. Of the 608,430 tons of steel produced in 1926, 424,412 tons was acid open-hearth, 174,108 tons bessemer, and 9910 tons electric steel. Table VIII also gives

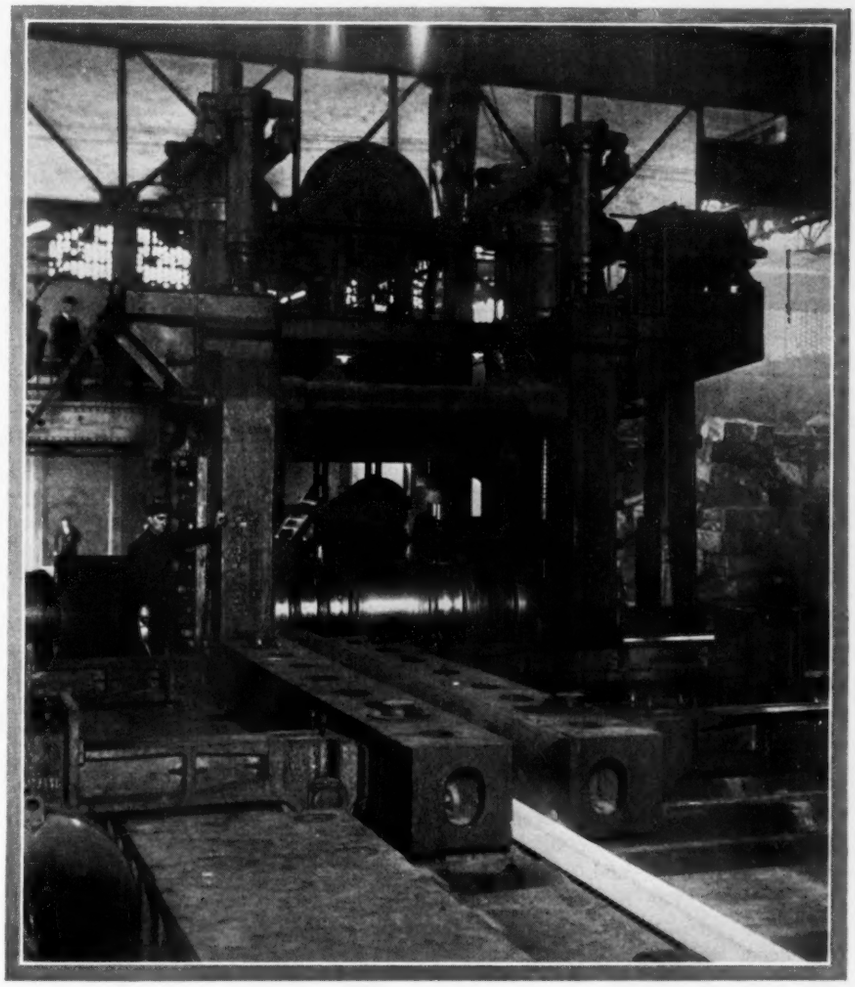
production figures for 1927.

In the province of Vizcaya the principal works are those of Baracaldo and Sestao, both operated by the Fabrica de Altos Hornos de Vizcaya with a capital of 100,000,000 pesetas ($16,666,666). The directors have been authorized to raise the capital to 125,000,000 pesetas ($20,833,333). This concern, located near Bilbao, is the most important producer in Spain. The works are self-contained, and a program of improvements laid down in 1923 and involving an expenditure of over 31,000,000 pesetas ($5,106,666) is practically completed. The works now are equipped entirely on modern lines, economies are being effected, and organized methods have enabled the company to reduce the number of workmen by 1000. The major portion of the output of pig iron is transformed at the works, which, in addition to pig iron and steel, produce rolled products, special steels, constructional steelwork and ordnance work. In 1926 the Baracaldo works produced 189,250 metric tons of pig iron, using 352,000 tons of iron ore, the figures for 1925 being 174,435 tons and 328,764 tons respectively. The value of a ton of the iron was estimated at 220 to 250 pesetas ($36.66 to $41.67). During the year under review, 115,326 tons of coke was produced and 151,945 tons of domestic coal was used. Coke was produced in 137 Solvay Carves by-product ovens. During 1926, 7644 tons of pig iron was sold, 176,744 tons was converted into steel, and the stocks at the end of the year amounted to 6310 tons.

The output of the Sestao works in 1926 was 79,937 tons of pig iron, using 171,000 tons of ore, as against 110,326 tons and 227,639 tons respectively, in 1925. Using 271,816 tons of domestic coal, the output of coke was 195,168 tons, in 143 Carves ovens and 80 Solvay ovens. Of the pig iron output, 36,357 tons was sold and 44,551 tons transformed into steel. There remained 8194 tons at the end of the year. The concern also operated a steelworks at Basconia, where 54,656 tons of steel ingots were produced in 1926, of which the average value per ton was 272.31 pesetas ($45.40). It also controls the Sociedad Francisco del Desierto, which produces pig iron and steel, and operates an electric steel furnace. The concern operates its own fleet of vessels.

There is only one steelworks in the province of Valencia, but it is an important one, and among the most modern in Europe. The works of Compania Siderurgica del Mediterraneo started operations with one blast furnace in 1925. They are situated on the sea at Sagunto. They are controlled by the firm of Sota and Aznar, iron ore merchants. The capital of the Sagunto concern is 100,000,000 pesetas ($16,666,666). Two furnaces now are operating, but the completed works will comprise four furnaces with a theoretical capacity of 450 tons each. Three acid open-hearth steel furnaces were operating in 1926, and an additional furnace now is in working order. A comprehensive range of steel products is manufactured at the works, which now are nearing completion.

The concern has a private harbor and operates its own boats for bringing in coal and ore and shipping ore and steel products. The rolling mills are modern and the layout assures a methodical flow from raw materials to finished products. The second blast furnace stack was blown in June 14, 1926. Subsequently the first blast furnace was blown out for a certain period to improve the process of cooling the bosh. Pig iron production of the Compania Siderurgica during 1927 amounted to 129,689 metric tons, tons of steel ingots. In 1926 the figures of steel ingots. In 1926 the figures were 87,020 tons of pig iron and 111,097 tons of steel ingots. The ingots are transformed in the mills and foundries, which in 1926 produced 89,924 tons of various sections, 1500 tons of sheets, 5024 tons of iron castings, and 717 tons of steel castings. The output of furnace coke was 92,536 tons. The output of various finished products in 1927 exceeded the tonnage of the previous year by a substantial margin. The works' capacity is continually increasing.



Blooming mill at Baracaldo works of Fabrica de Altos Hornos de Vizcaya. The rolls are 1055 *millimeters diameter*

Three concerns operate in the province of Oviedo. The Sociedad Metalurgica Duro-Felguera owns the works of Felguera. Two furnaces were active in 1926 and produced 31,480 metric tons of pig iron, of which 21,702 tons were used by the company for making steel. Three steel furnaces were active, one of 40 tons capacity, the two others of 30 tons. Production of ingots was 35,550 tons, the whole tonnage being transformed in the mills, which produced 21,041 tons of sections, 8213 tons of plates and sheets, 4743 tons of iron castings, and eighty-one tons of steel castings.

Table VIII

Iron and Steel Production by Provinces

PIG IRON

Province	Output (metric tons) 1927	1926	Number of works 1926	Furnaces 1926	Horsepower 1926	Number of workmen 1926
Viscaya	322,935	283,590	4	6	77,091	7,380
Valencia	129,689	87,020	1	1(*)	26,175	2,305
Oviedo	97,662	75,749	3	4	20,713	4,060
Santander	50,635	32,034	1	1	4,010	490
Others	10,857(†)	8,453(†)	3	6	3,475	655
Total	611,778	486,846	12	18	131,464	14,890

STEEL INGOTS

Viscaya	377,882	344,716	4	22	25,194	3,654
Valencia	123,627	111,097	1	3	(††)	(††)
Oviedo	100,850	75,551	3	10	(††)	(††)
Santander	42,272	31,991	2	10	11,408	1,738
Others	19,559	45,075	9	16	6,616	2,782
Total	664,190	608,430	15	61	43,218	8,174

(*) A second furnace was blown in in June, 1926. Subsequently furnace No. 1 was temporarily out of action.
(†) Charcoal iron.
(††) The figures are included in the pig iron table.

This company, which has a capital of 78,000,000 pesetas ($13,000,000), possesses its own coal and iron mines. It operates three batteries of by-product coke ovens, producing 300 tons a day from pulverized coal. Of the two blast furnaces now in action, one has a capacity of 80 tons and the other of 120 tons. The three steel furnaces have an annual capacity of 60,000 tons.

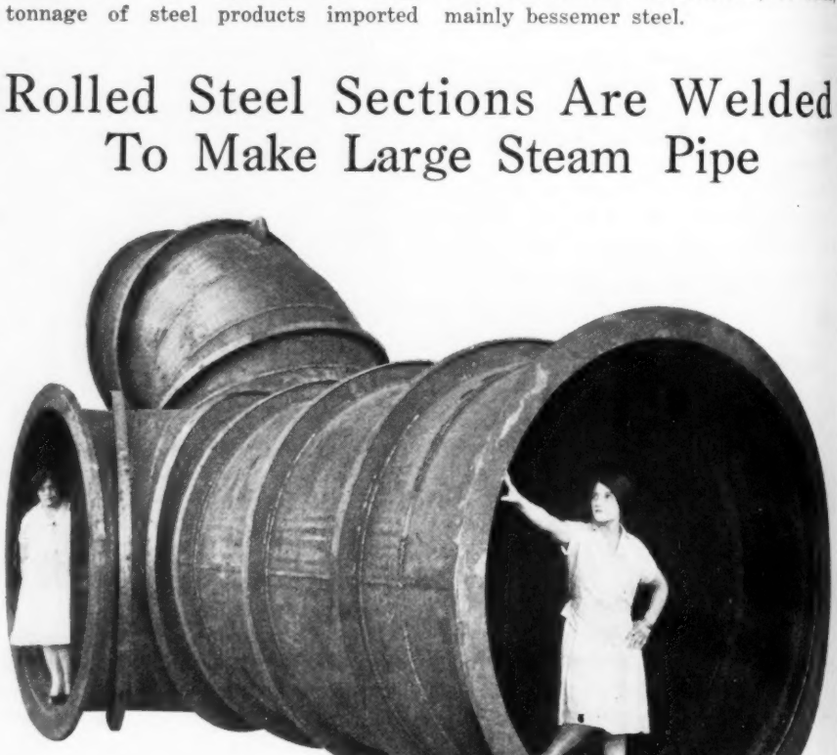
The Societa Anonima Fabrica de Mieras operates a plant at Albana. One furnace was in blast throughout 1926 and produced 20,705 metric tons. Two open-hearth steel furnaces of 20 tons capacity produced 18,333 tons of steel. The output of bars and shapes was 14,897 tons, and 1047 tons of iron castings also were produced. The company has a capital of 2,000,000 pesetas ($333,333) and employed 938 men in 1926. The Sociedad Industrial Asturiana operates the Fabrica de Moreda y Gijon at Gijon. This company has a capital of 10,0000,000 pesetas ($1,666,666). It operates one blast furnace stack, which in 1926 produced 23,564 metric tons of pig iron, four open-hearth steel furnaces, one of 10 tons, the others of 12 tons capacity, which together produced 21,558 tons of steel, and one electric furnace of 0.5-ton capacity. The output of the mills was 13,795 tons of bars and shapes, 1025 tons of plates and sheets, 427 tons of iron castings, and 1355 tons of steel castings. In the Santander district the Sociedad Anonima del Hierro y del Acero Neuva Montana, with a capital of 10,000,000 pesetas ($1,666,666), operates two 150-ton blast furnaces, two batteries of beehive coke ovens, and one battery of Semet-Solvay by-product ovens. A tube mill is operated in conjunction with the plant.

As already pointed out, Spain's iron and steel foreign trade is small. Table VII shows that exports were considerably higher in 1924 than in other years, due to an exceptional tonnage of pig iron, namely 23,983 tons, which went to Italy. The principal articles imported into Spain are ingots, semi-finished steel and merchant steel, coming mainly from Belgium, Luxemburg, France and Great Britain. The total tonnage of steel products imported into Spain from the United States in 1926 was about 2250 metric tons. On the other hand, 74,814 tons of Spanish ore was shipped to America.

The Spanish iron and steel industry receives protection from the government. A tariff is imposed on imported pig iron, which on certain grades is 45.60 gold pesetas ($9.12) per ton. The duty on steel ranges from 102 to 312 gold pesetas ($20.40 to $63.20) per ton. Iron and steel products imported into Spain must be accompanied by a certificate of origin. As is the case for coal, those concerns that receive support from the state, or work for the state, must use national steel, except when certain products are unobtainable in the country.

Under present circumstances the industry is enjoying a period of comparative prosperity. The works are busy and have received considerable orders from the railroad companies, which will keep them going for several months. Obsolete plants gradually are giving place to entirely modern works equipped with considerable foreign machinery, and as a result the capacity of production for steel is increasing year by year. At present it is estimated to be around 650,000 tons, mainly bessemer steel.

Rolled Steel Sections Are Welded To Make Large Steam Pipe



ONE of the largest steam pipes in the world recently has been completed at the South Philadelphia works of the Westinghouse Electric & Mfg. Co. It is seven feet in diameter and is composed of sections of rolled steel which have been joined together by arc welding, as shown in the accompanying illustration.

The pipe was built for installation in a large power plant. It will carry 1,600,000 pounds of steam per hour at 40 pounds absolute pressure.

Concrete Steel Institute Stresses Necessity for Cost Knowledge

Merchandising Problems Received Major Attention, Price Competition Condemned—Mill Relationships Improved

ATTENDANCE at the semiannual meeting of the Concrete Reinforcing Steel institute at Shawnee-on-Delaware, Pa., Oct. 1-3, was the largest by 50 per cent of any previous meeting of the institute. Directors of the institute, holding their quarterly meeting Oct. 1, elected to membership the Peden Iron & Steel Co., Houston, Tex., and Woodward Wight & Co., New Orleans. Charles M. Gunn, president of Gunn, Carle & Co., San Francisco, was elected a director of the institute, to fill the unexpired term of Edward L. Soule, of that city.

During the first day of the convention reports of committees were heard and approved. One in particular attracted attention, that of the committee on engineering, selling and cartage costs. This committee previously had confined its efforts to cost studies and reports of warehouse works operations. It now provides that, beginning Jan. 1, 1929, the institute will compile monthly reports from all its members on:

Cartage costs for the entire country with New York and Chicago shown separately;

Engineering costs, including estimating, engineering and overhead;

Selling costs, inclusive of all related activities, overhead and administration.

These cost figures are to relate only to reinforcing bars and spirals and not to accessories. Each member is to report under a confidential "key" designation and the composite reports, although concealing the members' identities, will show the high, low and average costs. The directors believed that the tendency to low quotations would be lessened if a better understanding of costs were possible.

President's Address Optimistic

"Is is not time that we distributors of reinforcing steel adopt the policy of taking only such business as we can secure at a reasonable profit?" Such was the tone of address by George E. Routh Jr., president of the institute. Excerpts from his speech include the following observations.

"We should realize that for the individual to be prosperous it is necessary for the entire industry to be prosperous and we should all work for the best interest of the industry, as selfishness will only react against us in the long run.

"The lack of sincerity shown between competitors is discouraging at times and I am certain that conditions in our industry would be materially improved if we would show the same honesty in business relations among ourselves as we do in social affairs and in sports.

"I want to stress the need for serious thought on the part of all members toward the deplorable condition into which our sales activities are drifting. We have too many detective salesmen out seeking cut prices with the result that the buyer is given every opportunity to put across the idea that he has a cut price although none exists. If our salesmen were to approach the buyer with the sole intention of selling his company's materials and service there would be far less talk and thought of cut prices and we would have a more stable market.

"Our sales organizations should be made to see that their own welfare depends upon a stabilized market which permits their employers to make a fair profit as without a fair profit it is impossible for their employers to reward their services as they would like to.

"Reasonable and proper merchandising methods dictate that we should determine the cost of our product, to which we should add the proper overhead expense plus a reasonable profit and were our business put on this basis and our salesmen given to understand that the price he is authorized to sell at has been based on a careful analysis of costs, and is the price which he is expected to get, do you not think that he would display more salesmanship and spend less time seeking cut prices?

"The establishing of this policy is, of course, affected by the fact that some of us do not know what our costs actually are. It is true that we have developed the reporting of our warehouse costs to the point where we now have more definite ideas as to the cost of these operations, but it is time that we develop a method of securing our engineering, selling and trucking costs. It is surprising how little real knowledge there is in our industry as to the actual cost of our engineering. It is common practice to consider engineering costs only in terms of money expended in salaries, overlooking other items, which in total are just as great an expense and which are part of our engineering costs, such as blue printing, stationery, rent, heat and light and other items of a similar character, and I might add that the expense of supervision is an important factor."

Mr. Routh in discussing the subject of publicity stressed the promotion of the apartment and residential field, especially the application of reinforced concrete to floor construction. Mr. Routh also encouraged strict adherence to the standard contract form adopted by the institute. He commented on the improvement in mill relationship and stated that the amount of foreign steel entering the United States is decreasing, due to the difficulty in handling.

Building Commissioner Speaks

Following the address of the president several committees and the treasurer reported after which Frank Burton, former city building commissioner at Detroit spoke on the subject, "A History of Building Codes."

The Tuesday morning session was featured by an address by Walter C. Conger, vice president of the Truscon Steel Co., following reports from committees and R. W. Johnson, institute engineer.

Mr. Conger said in part:

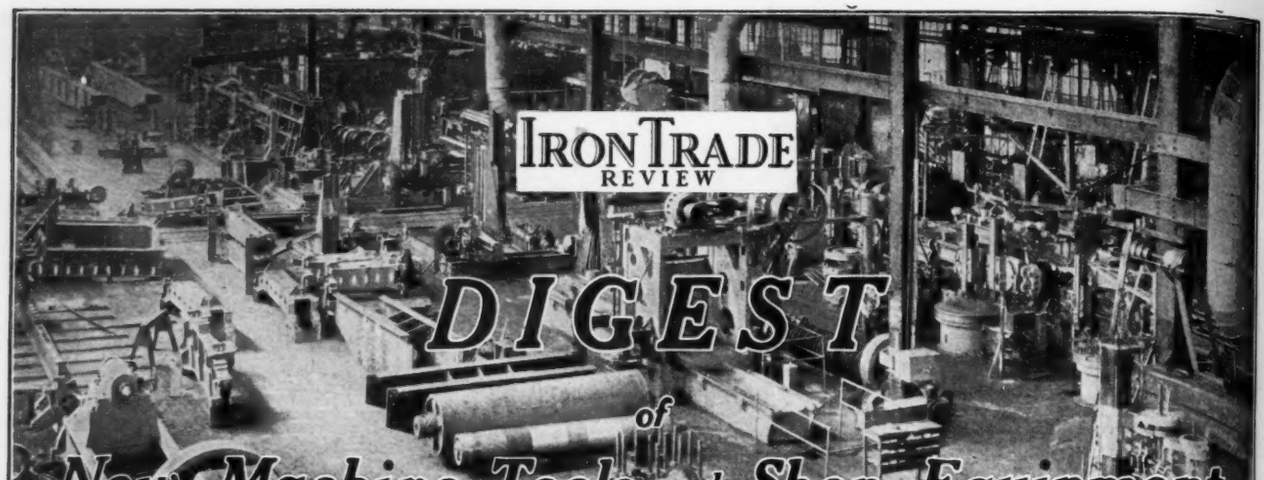
"Cost accounting is expensive, but a company which does not know thoroughly every phase of its costs, gambles with the most destructive influence that can enter into any industry.

"For any study of sales application, 'Control of Selling Costs' should be divided into four divisions: First, creation of demand; second, establishment of outlets; third, influencing of markets, and fourth, maintenance of sales spirit." Direct returns are possible from capital expended within the second division, while returns for capital invested to bring about results within the first division, and the last two divisions, are more indirect.

"Advertising and personal contact of promotional representatives are the prime means of creating demand. Both efforts should be used in connection with specialty products. For commodity products, constructive advertising alone proves to be sufficient. Advertising is selling on a mass basis."

Commenting on personnel Mr. Con-

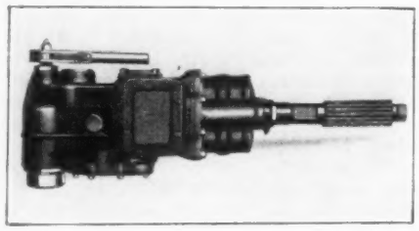
(*Concluded on Page* 960)



New Close Quarter Drill Is Introduced

No. 256

Ingersoll-Rand Co., 11 Broadway, New York, recently has offered to the market a new gear driven close quarter drill with a 2-cylinder double-acting air motor. The drill has been designed for general drilling work, reaming and tapping in close quarters. Minimum thickness of the machine has been obtained by making it flat, the drill being practically the same thickness from the spindle to the cylinders, as shown in the accompanying illustration. Smooth operation is said to have been secured by arranging the pistons to act at right angles to and in a plane with the spindle, and by using a counterbalanced crank and special gears for the drive. Size and strength of the gears is increased as the load carried is increased until the final drive on the spindle is through a heavy herringbone gear which is said to give smooth and steady driving action. Bearings of the ball and roller type are used throughout. Three different spindles can be furnished for the drill. The average working speed at 90 pounds air pressure is 140 revolutions per minute. Length of feed is 2½ inches; length overall is 9¼ inches. Distance from side to the center of the spindle is 1 9/16 inches. Net weight of the device is 41 pounds.



No. 256—Close quarter drill

Develops Substitute for Drill Bit Diamonds

No. 257

Sullivan Machinery Co., 30 Church street, New York, has developed a material for use as a substitute for black diamonds and carbons in settings for diamond core drill bits. The material is a metallic alloy having practically the same characteristics as carbon or black diamond with the exception that it is not as hard. However, it is said to be considerably harder than emery, carborundum and similar substances. The new material is used most advantageously in drilling operations in soft limestone, soft sandstone, shale and other relatively soft sedimentary strata. It is claimed by the manufacturer that, in such cases, the lower first cost of the new cutting material offsets the slower progress and the higher cost per

Iron Trade Review's Calendar of New Equipment

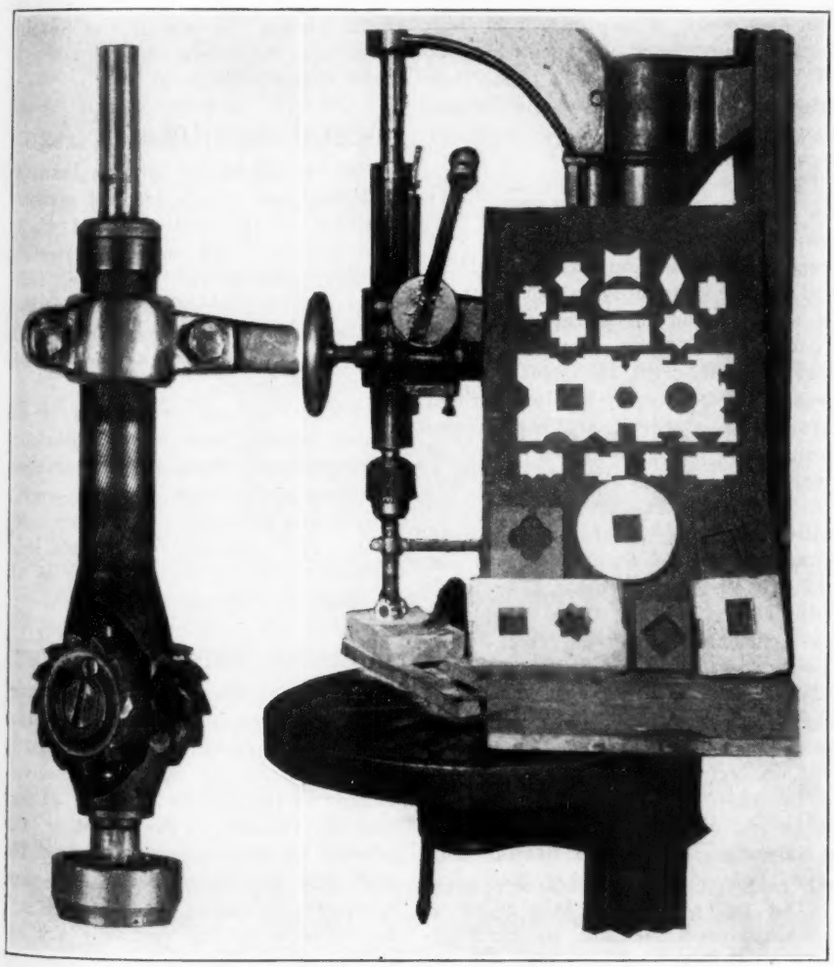
No.	Item	Builder	Comment	Date Described
233.	Milling head	Pratt & Whitney Co.	Internal milling attachment for thread miller	Sept. 13
234.	Arc welder	Fusion Welding Corp.	Portable; driven by gasoline motor	Sept. 13
235.	Magnetic contactor	Cutler-Hammer Mfg. Co.	Automatic control for lighting and power circuits	Sept. 13
236.	Blowers	P. H. & F. M. Roots Co.	Roller and ball bearings incorporated on all models	Sept. 13
237.	Regulating rheostat	Cutler-Hammer Mfg. Co.	Speed control for fractional-horsepower motors	Sept. 13
238.	Electric motor	General Electric Co.	Single phase repulsion induction type	Sept. 20
239.	Molding machines	Osborn Mfg. Co.	Portable types for medium size molds	Sept. 20
240.	Semisteel pulley	W. A. Jones Foundry & Machine Co.	High wearing qualities; suited for jerky load	Sept. 20
241.	Open-side planer	Cleveland Planer Co.	48-inch type designed to do work of 60-inch machines	Sept. 20
242.	Acetylene generator	Oxweld Acetylene Co.	Three sizes; 50, 100 and 300-pound carbide capacities	Sept. 20
243.	Cutting torch	Air Reduction Sales Co.	Improved high-pressure valve construction	Sept. 27
244.	Arc welder	Lincoln Electric Co.	Tractor-type; for lap or butt welding	Sept. 27
245.	Slip roll former	Niagara Machine & Tool Works	Will handle 22-gage metal	Sept. 27
246.	Coupling	T. L. Smith Co.	Full-floating flexible type for driveshafts	Sept. 27
247.	Truing fixture	Gleason Works	For truing circular cutters	Oct. 4
248.	Shaper	Cincinnati Shaper Co.	Wide range of speeds and cross feeds	Oct. 4
249.	Center lathe	Bullard Machine Tool Co.	Independent spindle and tools speeds at each station	Oct. 4
250.	Grinding wheel	Blanchard Machine Co.	Six abrasive segments clamped into chuck	Oct. 4
251.	Riveter	Chicago Pneumatic Tool Co.	Squeezes instead of hammers rivets into place	Oct. 4
252.	Electric drills	United States Electrical Tool Co.	Portable, high speed, ¼-inch type	Oct. 4
253.	Draw-cut shaper	Morton Mfg. Co.	High duty type; 32-inch stroke	Oct. 4
254.	Shape cutter	Linde Air Products Co.	Cuts with oxyacetylene blowpipe; automatic operation	Oct. 4
255.	Assembly press	Hanna Engineering Works	For use in chassis frame riveting installations	Oct. 4
256.	Drill	Ingersoll-Rand Co.	Operated by air motor; for close quarter work	Oct. 11
257.	Cutting material	Sullivan Machinery Co.	Substitute for diamond in diamond core drill bits	Oct. 11
258.	Boring tool	Schmidgall Mfg. Co.	Drills variety of holes in wide range of materials	Oct. 11
259.	Compound crane	Modern Pouring Device Co.	For double crane service on wide crane bay	Oct. 11

foot drilled. The substance is furnished in cubes or octagons which are suited for the different sizes of bits in ordinary use.

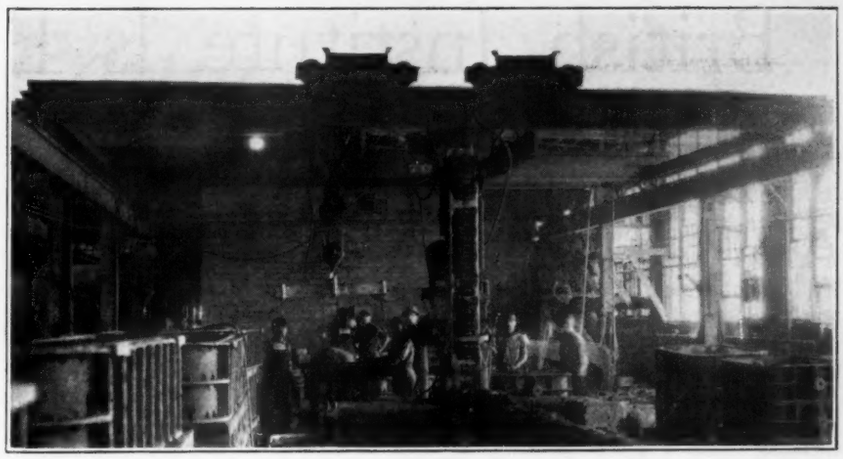
Perfects Tool To Drill Variety of Holes

No. 258

Schmidgall Mfg. Co. Inc., 307 Cass street, Peoria, Ill., recently has designed a new boring and milling tool for boring round, square and irregular-shaped holes. The machine may be used to bore glass, steel, wood, building stone, grindstone and many other materials. It is adaptable to milling machines, lathes, horizontal and vertical drilling machines, and can be used as a portable electric drill. The versatility of the machine may be noted by the various shaped holes which have been bored by the device, as shown in the accompanying illustration. At the left in the illustration is a three-quarters view of the machine showing the arrangement of cutters with a pilot attached. With the cutters shown, the drill is equipped to drill stone. Other materials and other types of holes are drilled by changing the cutters. Milling, shaping, key cutting, grooving and dovetailing are processes to which the device is said to be especially applicable.



No. 258—(Left) Boring tool equipped to drill building stone. (Right) Tool in operation; various types of holes which drill will bore



No. 259—Compound crane construction for double crane service

New Design in Compound Crane Construction

No. 259

Modern Pouring Device Co., Port Washington, Wis., recently has designed a compound crane construction for double crane service on a large span crane bay, said to be a new development in hand-operated cranes. As shown in the accompanying illustration, a large box crane spans the entire bay. This crane has a double I-beam bridge, the beams supporting the tracks for the smaller service cranes. It is said to be possible to operate two or three cranes on these tracks independent of one another. The construction is applicable in high speed molding operations in foundries where the speed of transporting the material determines the production. Several crews can work under the compound crane at one time. The hand-power cranes are of the small span type and are said to handle easily.

Oppose Canadian Tariff

Toronto, Ont., Oct. 9.—The advisory tariff board sitting at Ottawa Oct. 2 heard the application of the Algoma Steel Co., Sault Ste. Marie, Ont., for upward revision of the tariff of pig iron and structural steel, and abolition of drawbacks on specially treated steel and alloys. The company claimed that prices for pig iron in face of American competition gave it no profits, only six out of 18 furnaces being in operation. The increase in duty was asked to give the company a fair profit.

The application was strongly opposed by representatives of several iron and steel using companies, including the Ford Motor Co. of Canada, the Canada Car & Foundries, Montreal, National Iron Corp., and Dominion Foundries Ltd. The general contention of the opposing interests was that such a provision would seriously limit the source of supplies, increase prices, and encourage substitutes of alloy steel. The hearing was adjourned until November.

Value of gold, silver, copper, lead and zinc produced in Arizona in 1927 was $98,790,957.

British Institute Is Entertained by Spanish Industry

AT THE invitation of the members resident in Bilbao and the neighboring district, the autumn meeting of the British Iron and Steel institute was held at Bilbao, Spain, Sept. 25 and 26. The last visit of the institute to Bilbao was in 1896.

About 150 members attended, representing Great Britain, Spain, France, Holland, Sweden, and the United States. Benjamin Talbot, president of the institute, headed the delegation, and Professor Henry Louis, president elect, also was present. Before reaching Bilbao, delegates were received by Her Majesty Queen Maria Cristina at the royal palace of Miramar. The technical sessions took place at the Assembly Hall of the Alfonso XIII high school in Bilbao. In the opening speeches, references were made to the conditions of the iron and steel industries in Great Britain and in Spain. The two nations have many points of contact, the British works using a considerable tonnage of rubio ore from Spain, while Britain is the principal supplier of imported coal to Spain, a large portion of which is used by Spanish iron and steel works.

Paper Surveys Ore Mining

The first paper was: "Iron Ore Mining In Vizcaya," by Jose Balzola, mining engineer, of Bilbao. This paper gives a survey of present methods of ore mining in the province of Vizcaya, which is one of the most important districts of Spain from the viewpoint of ore production. In the conclusion of his paper, the author states that one may reasonably estimate that present workings show a content of some 65,000,000 tons, of which, say, 40 per cent is probably spathic. From borings made in virgin mines one deduces a reserve of some 40,000,000 tons of ore, principally spathic, and a conservative addition of a further 60,000,000 tons in unbored parts of the district may be supposed.

The second paper was entitled, "The Use and Interpretation of the Transverse Test for Cast Iron," by J. G. Pearce, director of the British Cast Iron Research association, Birmingham. This paper will be further presented for discussion at an adjourned meeting in Birmingham, Eng., Oct. 25.

L. B. Pfeil, of University college, Swansea, presented a paper entitled, "The Change in Tensile Strength Due to Ageing of Cold-drawn Iron and Steel." In the experimental work described in this paper, the tensile test was employed as a measure of the capacity of the metal to undergo age-hardening after cold-drawing, and it is shown that the phenomenon is chiefly due to the presence of carbon. Professor C. A. Edwards, principal of the University College, Swansea, and Taketo Yokoyama, of Tohoku, Japan, gave a paper on, "The Influence of Varying Strains and Annealing Temperatures on the Growth of Ferrite Crystals in Mild Steel."

Sr. Dn. A. Herrero and M. de Zubiria, of Bilbao, presented a contribution on, "The Phenomena of Corrosion of Iron and Steel." The authors mention the fact that Spanish metallurgists and engineers now are manufacturing the so-called rustless steels. However, the high cost of these steels greatly restricts their application, and the problem of corrosion lies more in the fact that any economic solution of the question must be such that it will not raise the price of ordinary commercial steels above that at which they must of necessity be sold.

"The Influence of Pearlitization below the Ar^1 Point on the Mechanical Properties of Carbon Steels," was presented by Joaquin Orland, of Madrid. This paper was accompanied by a number of photographs showing fractures of impact test-pieces, and microstructures. S. H. Rees, of the Research Department, Woolwich, Eng., contributed a paper entitled, "Some Properties of Cold-drawn and of Heat-treated Steel Wire." The author carried out investigations on cold-drawn alloy steel wire obtained from the firm of Samuel Fox & Co. Ltd., Stocksbridge Works, near Sheffield, Eng. The material employed was chromium-vanadium steel, cold-drawn from 0.375 x 0.212-inch rod to 0.25 x 0.06-inch wire in six holes. The author shows that the conclusions previously arrived at in connection with carbon steel wire are applicable in the case of cold-drawn chromium-vanadium steel wire when suitable modifications of the quantitative data have been made. Further discussion of this paper also will take place at the adjourned meeting in Birmingham in October. J. H. Whiteley, of the Consett Iron Co. Ltd., Durham, presented a paper entitled, "Effects Observed in Quenched Liquid Steel Pellets and their Bearing on Bath Conditions."

During the sojourn of the delegates in Bilbao, the works of the Altos Hornos Co. of Vizcaya, at Sestao and Baracaldo, the iron ore mines, the plant of the Babcock & Wilcox Co., the steel, tinplate and the structural works at Basconia, Constructora Naval, ships and railway material, and the Echevarria, which specializes in the manufacture of special steels, the works of Euskalduna, manufacturers of railroad rolling stock and ships. Following the meeting in Bilbao, a tour was organized through Burgos, Madrid, and Sagunto; in the last-named locality the modern works of Cia. Siderurgica del Mediterraneo were visited. The party then returned to Madrid and visited Toledo, the copper works of the Compania Electromecanica de Cordoba at Cordoba, and Seville, where they had an opportunity of seeing the site of the Spanish industries exhibition, which now is under construction.

Metal Institute of Age

The council of the British Institute of Metals has issued the new session's program of the institute and of its local sections. An important meeting is that planned for March 6, 1929, when the coming-of-age celebrations of the institute will be held in London under the presidency of Dr. Walter Rosenhain.

Another interesting feature is the annual autumn meeting in Dusseldorf in September. This is the first occasion that any British scientific society has held a meeting in Germany since 1914. The programs of the six local sections of the institute cover in all 42 papers and meetings.

Claims Biggest Hangar

Officials of the National Air Transport Co. have announced completion of plans and specifications for what is believed to be the largest commercial hangar in the United States, for erection in Chicago. The building will provide an unobstructed space of 160 feet, and will accommodate the new passenger transport planes which will be delivered to the company for use in the New York-Chicago passenger service to be opened next spring.

Editorials

Business Failures Introduce Paradox

PARADOXICAL as it may seem—business failures mount as business improves. Of course it is natural that with the increased amount of business transacted the ratio of business failure should expand. By the same token, however, increased prosperity making more business possible, should bring less chance of failure, with its easier monetary conditions and less overhead because of greater efficiency in operation, less labor turnover, etc.

According to reviews of R. G. Dun & Co. and Bradstreet, business failures in the United States increased both in number and in total liabilities in August. It might seem strange to have these figures come out after a period of apparent betterment. Orders for iron and steel have increased both in number and volume; production is mounting; employment is increasing. These things are true not alone in the steel industry but in numerous diversified lines.

An analysis of August failures, however, would possibly reveal a vast number of small enterprises commenced co-incidental with the summer months. These, having started on a shoe string, have ended the same way. If that is true the reports under discussion lose much of their significance. The report of increasing industrial failure need not be unnecessarily alarming at this time since the successful ventures are daily increasing.

No Snap Judgment on Labor Laws

LEADERS in union labor organizations and their friends have been seeking to array labor unions in a battle on the question of labor injunctions. Both presidential candidates have suggested the desirability of remedying defects in the administration of the injunction process of law, as applied to labor troubles.

The injunction in the past has been supported by public opinion. In labor difficulties it has served admirably to curb lawlessness and in preventing mob vengeance in the destruction of property and injury and intimidation to those who were willing to work. The injunction has been abused, as have other processes of law. Despite the agitation of anti-injunctionists, no action likely can be taken in the coming short session of congress. Any further legislative steps undoubtedly must be held in abeyance until another year.

The movement to curb the injunction probably will result in extreme measures if the matter of framing legislation is left entirely to the unions themselves. Some leaders are hardly in a charitable frame of mind about it. It is the duty of employers' organizations to see that if any legislation is enacted, a sane course is followed, one which will eliminate abuses and at the same time support the injunction as a proper safeguard to the best interests of business.

Rational Ship Operation Favored

CONFERENCES of federal department agencies under the office of the chief co-ordinator of the United States are being held in Washington to determine whether the government has authority to designate a uniform time for opening and closing navigation on the Great Lakes. It will be recalled that the government started suit at Cleveland last spring against 20 Great Lakes steamship companies to compel them to open the navigation season earlier than they had intended. Some grain shippers charged "collusion" to shorten the shipping season and thus insure a better market for vessel capacity. As pointed out in these columns at the time, weather conditions are the determining factor; and as it subsequently developed, the vessels were unable to navigate as early as April 15, the date the grain shippers wanted them to start. Ice and storms held them back until May 3, even later than the vessel owners had desired.

This practical illustration caused the government suit to lapse. Now, with winter approaching when navigation again will be hazardous, federal departments are discussing the problem from a different angle. They have held preliminary conferences and have invited representatives of the shippers, vessel companies, chambers of commerce and other interests to attend a general meeting. They recognize there is question whether the government has authority. The Canadian department of marine has just recommended to Great Lakes vessel owners to close the season Dec. 5, admitting that it is a recommendation, and nothing more.

The Great Lakes iron ore, coal and grain carrying fleet is valued at more than $200,000,000. Insurance is increased after Nov. 30, again after Dec. 5, and is withdrawn after Dec. 12. Last winter the insurance companies sustained considerable loss because boats ventured out too late, hence the suggestion from the government.

American vessel owners are heartily in accord

with a policy of rational operation. They can see no more reason for risking life and property too late in winter than too early in the spring. The government should not, and evidently will not, lay itself open to public criticism in case of serious accident, merely to satisfy a few grain shippers who hope to obtain lower rates.

Fourth Quarter Starts Out Well

ENCOURAGING information is contained in IRON TRADE REVIEW'S monthly data on pig iron production and blast furnace operation. Interpreted in the light of recent shipping records and market developments, the facts surely warrant confidence in the outlook for the fourth quarter.

More pig iron was shipped from blast furnaces to consumers in September than in any previous month this year, the increase over August in the Middle West approximately 15 per cent. A heavy gain in shipments was reported in the latter part of September. Following this, the record of furnace operations in September discloses a net gain of 11 or more active stacks during the month, the majority of which were blown in during the last week of the month. The full effect, therefore, will not be reflected in the rate of production until the returns for October have been tabulated. Each month since spring has registered an improvement in shipments; so many additional furnaces would not be put on at this time unless there was strong prospect of a continuation of active demand by the steelworks. At the same time, the increase in furnace operations points to a better daily rate of output than in September.

The daily rate of pig iron production climbed steadily during the first six months this year. In July the rate stepped down slightly, since which month it has resumed its upward trend. Last year the daily rate reached its highest point in April and then drifted downward through the remaining nine months. The trends since March have been opposite, in the two years.

Reduced stocks, heavy shipments, and the enlarged demands for steel are factors which tend to support a forecast that the fourth quarter will be the best of the year.

College Pays Its Way with Research

A SINGLE piece of research, accomplished by the expenditure of a few thousand dollars of public funds, at the Michigan College of Mining and Technology, will return to the public each year a sum approximately equal to the entire amount appropriated for buildings, grounds and operation of the college from the time it was established in 1886 to the present day. It was demonstrated at the college this year that the copper loss in amygdaloid tailings could be reduced from 4½ pounds per ton to about 1½ pounds, equivalent to increasing the selling price of amygdaloid copper approximately 2 cents per pound.

Besides the immediate benefit derived from the process it will stimulate prospecting, and there is the possibility that hitherto worthless piles containing tens of millions of tons of amygdaloid tailings may be worked with profit. In estimating the importance of this accomplishment, in cooperation with the United States bureau of mines, the president of the college bases his figures on a consideration that 90 to 95 per cent of the gross proceeds of any industry are distributed to the community as payment for labor, supplies and raw materials.

That the public has benefited to an unusual degree through research at the Michigan college, as well as at the Minnesota school of mines there can be no doubt. Several achievements can be cited that are worth millions of dollars to those states in the promotion of their mineral interests. They are taking the initiative, especially in the development of iron ore beneficiating processes, in a way that is of inestimable value to the iron and steel industry.

Building Basis Is Sounder

BUILDING construction leaders from all parts of the country, meeting in Minneapolis last week under the auspices of the Associated General Contractors of America, heard reports that except in the cases of a few cities having a surplus of apartment houses, an over-built condition does not exist. The conclusion was that in the case of most communities large numbers of structures are becoming obsolete, not only because of age but because of demands made by the increasingly high American standard of living.

It is generally conceded that a marked decrease in the amount of speculative building has occurred, but it is evident that a large part of this slack has been offset by the increase in volume of public works operations in many centers. Indications are that 1928 building construction will equal if not exceed the heavy program of a year ago. As one of the major consumers of steel, the building industry gives promise of continued progress along sound, healthy lines. Construction leaders have rectified many evils in the industry, and the groups financing construction work have succeeded in checking much that was purely speculative.

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E. L. SHANER, Editor. — *J. D. PEASE, Advertising Director.* — *F. F. LIGHT, Circulation Manager.*

Tool Material Scratches Sapphire
Page 912

SPECIAL attention is given in this issue to the National Metal Exposition, in progress in Philadelphia. It is featured with comprehensive descriptions of the various exhibitions and photographs. A large corps of staff representatives from the Cleveland and New York offices of IRON TRADE REVIEW are at the exposition, and as an additional service, the Penton Publishing Co., publisher of IRON TRADE REVIEW, is issuing a *Steel Treaters' Daily*, a full-size newspaper, reporting the exposition and convention. Next week's issue of IRON TRADE REVIEW will feature the technical papers.

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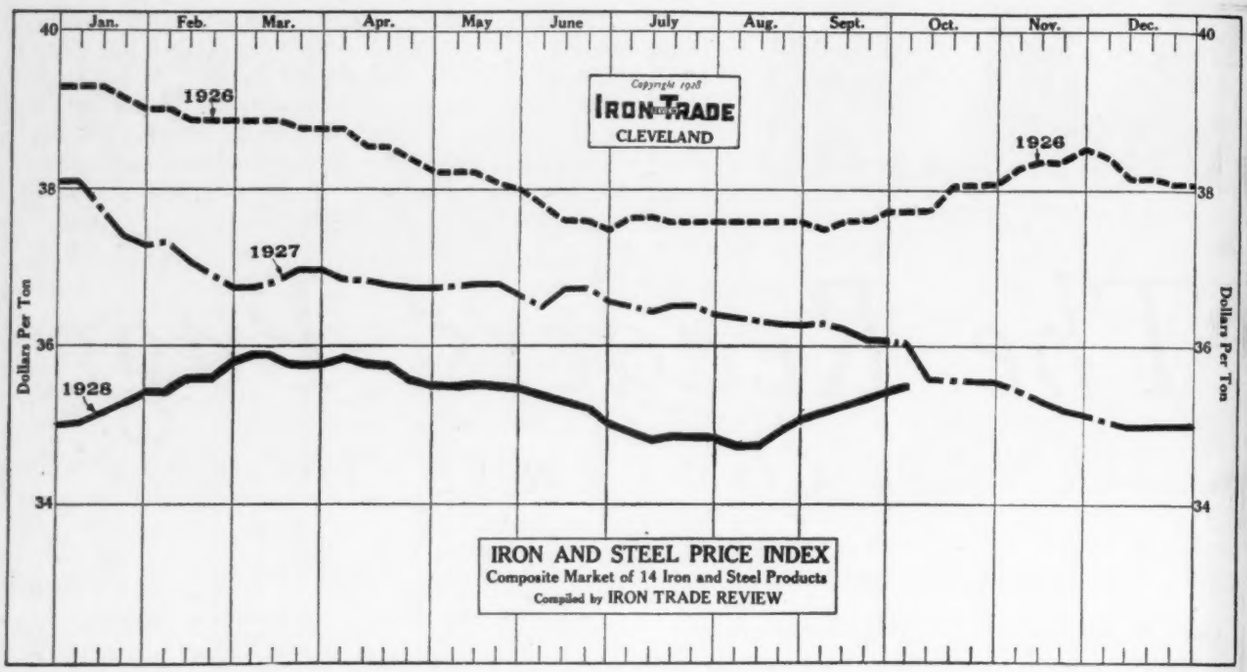
The Business Trend



Iron and Steel Quotations Improve

By JOHN W. HILL, Financial Editor

FOR the greater part of the past decade the iron and steel industry has been suffering from the severe malady of low earnings. This has been true notwithstanding the fact that the same period has been marked by unprecedented steel mill activities. The small return upon invested capital has been due largely to the depressed prices which have prevailed.

THERE is now, for the first time in recent years, strong evidence that the tide has turned for the industry—that henceforth over the months to come, price conditions will be firmer and earnings on a more adequate plane. Unquestionably the great basic line of iron and steel is in the strongest position of recent years. Curiously enough some part, at least, of this strength is due to the low price era.

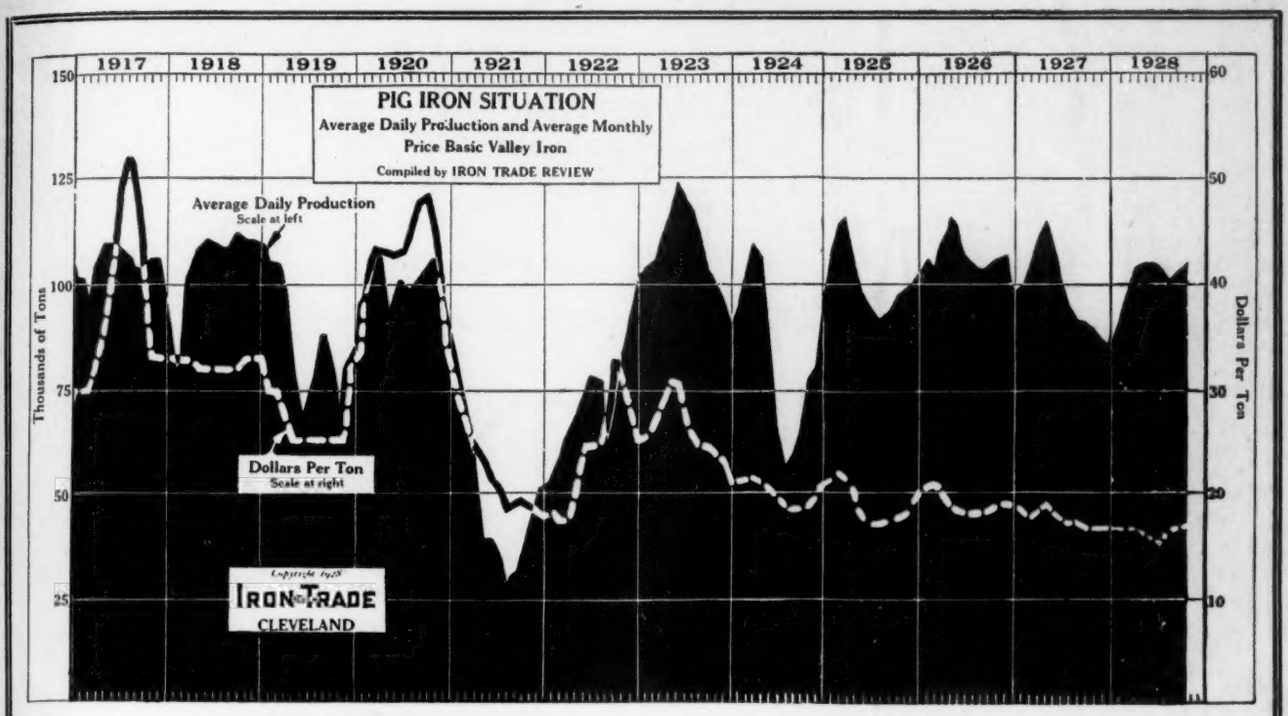
FALLING prices and feeble earnings have stimulated the steel industry to take corrective steps. The most important of these has been the tremendous increase in productive efficiency. In this respect the steel mills have taken a leaf from the book of one of their largest customers—the motor car trade. Automobile manufacturers have been most insistent upon lower prices.

AT THE same time, they have pointed the way and blazed the trail toward lower costs which would make cheaper prices possible. The only trouble is that in many cases prices were pushed down more rapidly and much further than could be compensated by rising steel mill efficiency. But now that bearing down process apparently has reached its limit.

DURING the years of the recent past the iron and steel industry has been spending huge sums upon improved machinery and methods but not upon a direct comparable expansion of steel making capacity. In a time of healthy and active demand it is probable that there is no such great excess of effective producing capacity as many consumers until lately had assumed.

RECOGNITION of this fact is the most important factor in making prices firmer. It is unlikely that there will be any violent upward swing for quotations. The important thing is that the long downward swing apparently has ended. This fact combined with the greater efficiency of the iron and steel industry and the prospects for continued good business renders the outlook the most favorable of recent year.

The Business Trend

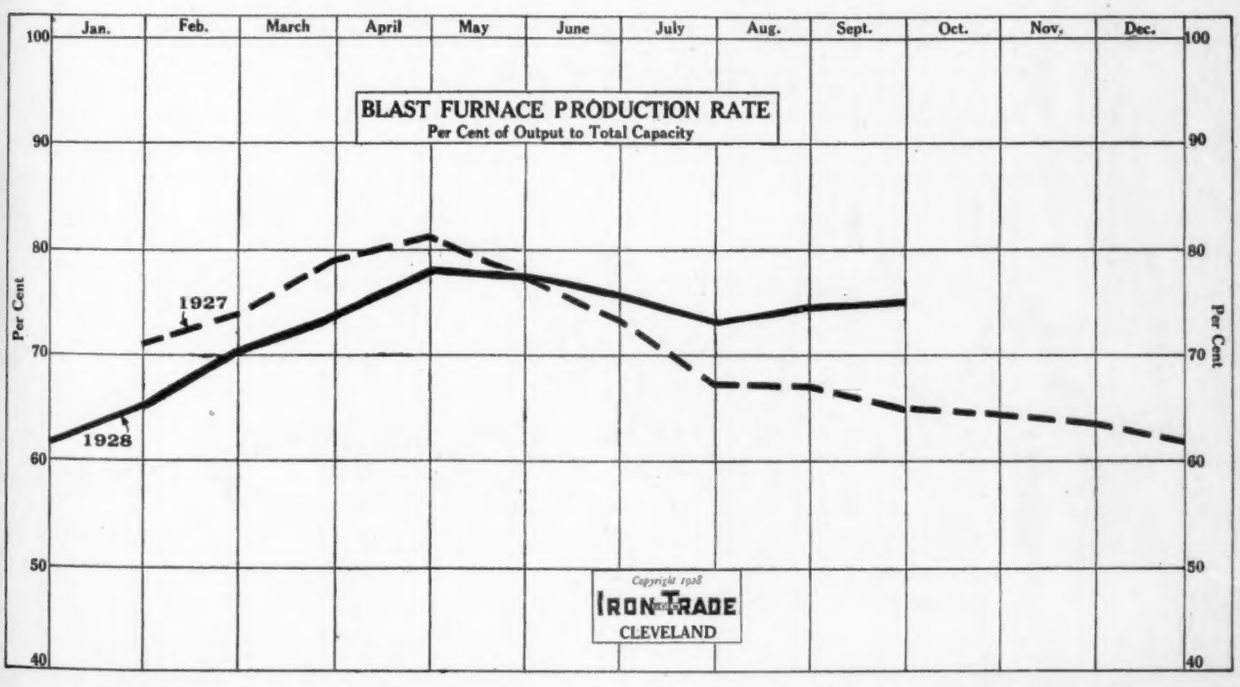


Pig Iron Situation

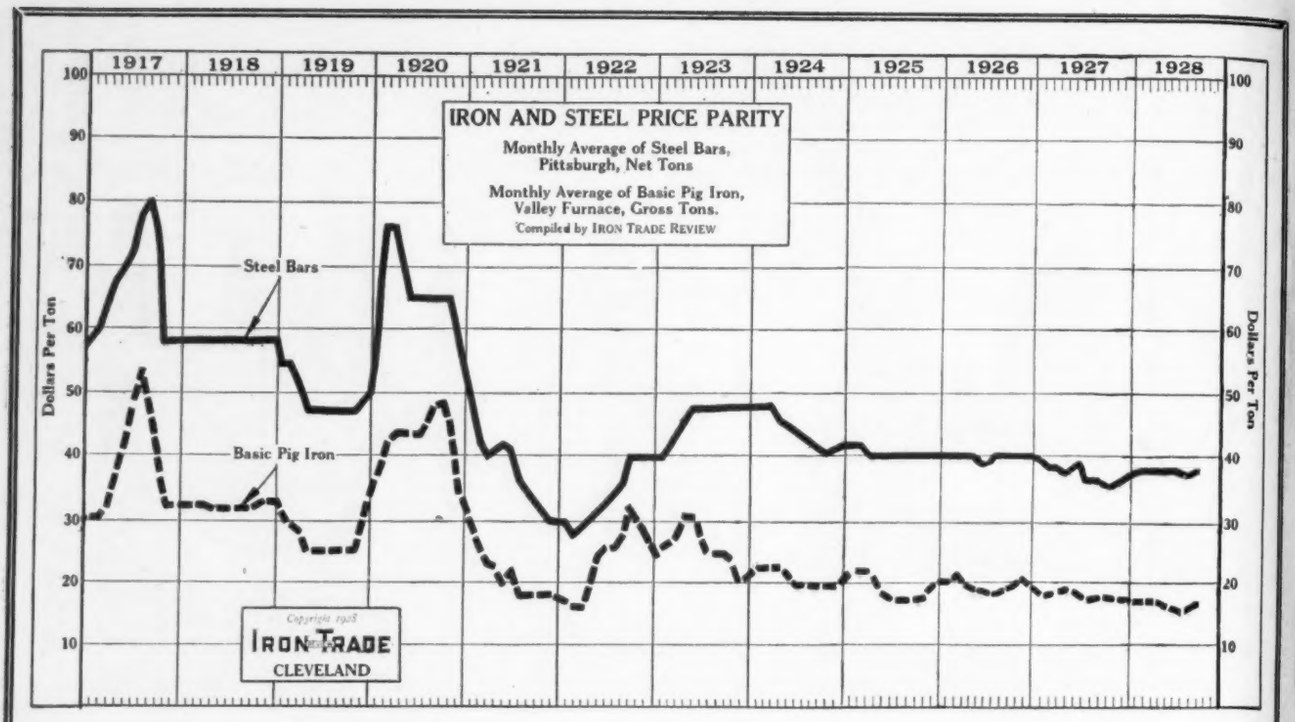
FURTHER emphasizing the difference in the trend compared with one year ago, pig iron production in September scored another increase. The daily average output for the month was 102,117 tons, compared with 101,193 tons in August and 92,750 tons in September, 1927. During September one year ago there was a decline in output from the August daily average of 95,183 tons. Production for the first nine months of 27,783,699 tons compares with 28,117,026 for the corresponding period in 1927.

Blast Furnace Rate

SEPTEMBER brought another increase in the rate of operation of blast furnaces. Production for the month was 75.2 per cent of the rated capacity of furnaces in the country. This compares with 74.4 per cent in August and with 65.9 per cent in September one year ago. The low point in the percentage of production to capacity for the year came in July with 73.2 per cent. The figures are based on coke pig iron capacity of 49,605,720 gross tons as of the close of 1927.



The Business Trend

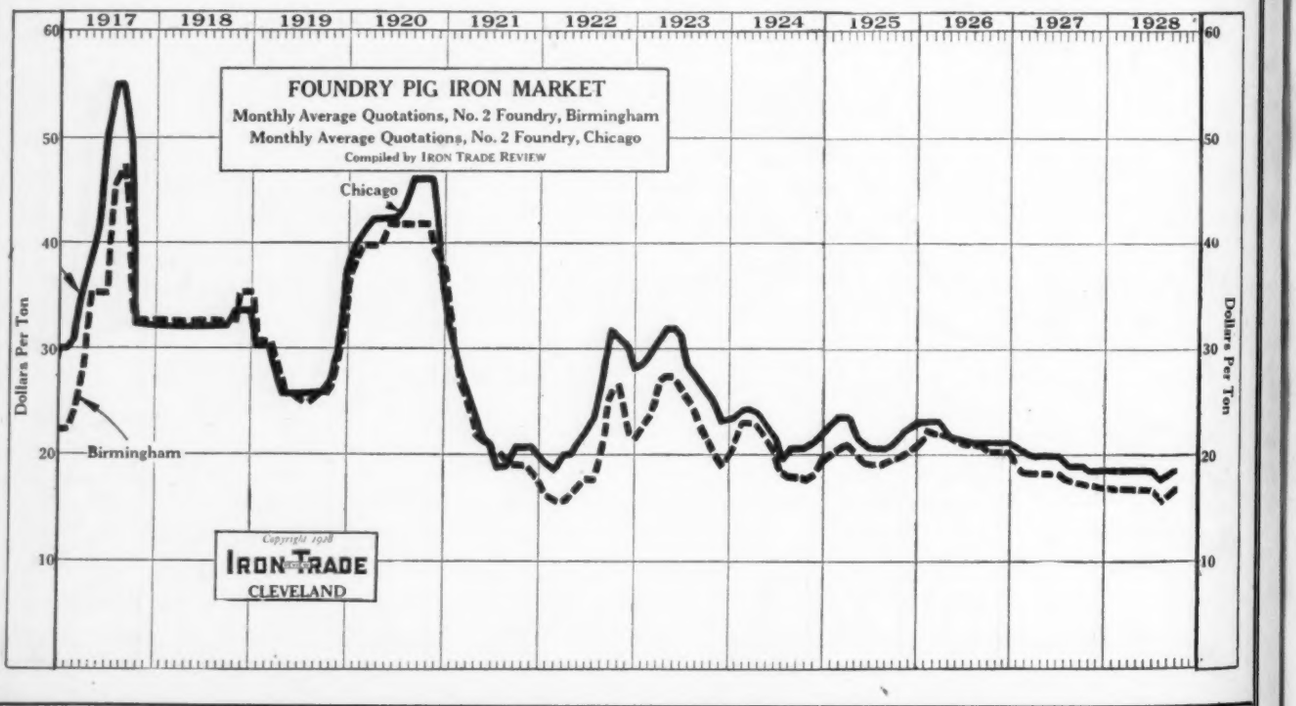

IRON AND STEEL PRICE PARITY
Monthly Average of Steel Bars, Pittsburgh, Net Tons
Monthly Average of Basic Pig Iron, Valley Furnace, Gross Tons.
Compiled by IRON TRADE REVIEW
Steel Bars
Basic Pig Iron
Dollars Per Ton
1917 1918 1919 1920 1921 1922 1923 1924 1925 1926 1927 1928
IRON TRADE
CLEVELAND

Steel Price Parity

SOME further strength has lifted pig iron prices from their recent low level. Notwithstanding this fact the spread between finished material and pig iron has widened in recent weeks. Steel bars at Pittsburgh in September have reached $38.00 a ton. This compared with an average of $16.10 a ton for basic valley pig iron, showing a spread of $21.19 in favor of bars. In August the average price for bars was $37.00 while that of basic iron was $16.00, showing a spread of $21.

Foundry Pig Iron Market

THE market for foundry pig iron has been making steady progress in recent weeks. No. 2 Chicago reached its low point in July at $17.50 a ton. The average for July and August was $17.60 a ton but in September there was a series of advances which brought the average for that month to $18.30 a ton. In the first week of October the price was $18.50 a ton. Southern No. 2 Birmingham has advanced from its low of $15.50 a ton in July to $16.25 a ton for the average for September.


FOUNDRY PIG IRON MARKET
Monthly Average Quotations, No. 2 Foundry, Birmingham
Monthly Average Quotations, No. 2 Foundry, Chicago
Compiled by IRON TRADE REVIEW
Chicago
Birmingham
Dollars Per Ton
1917 1918 1919 1920 1921 1922 1923 1924 1925 1926 1927 1928
IRON TRADE
CLEVELAND

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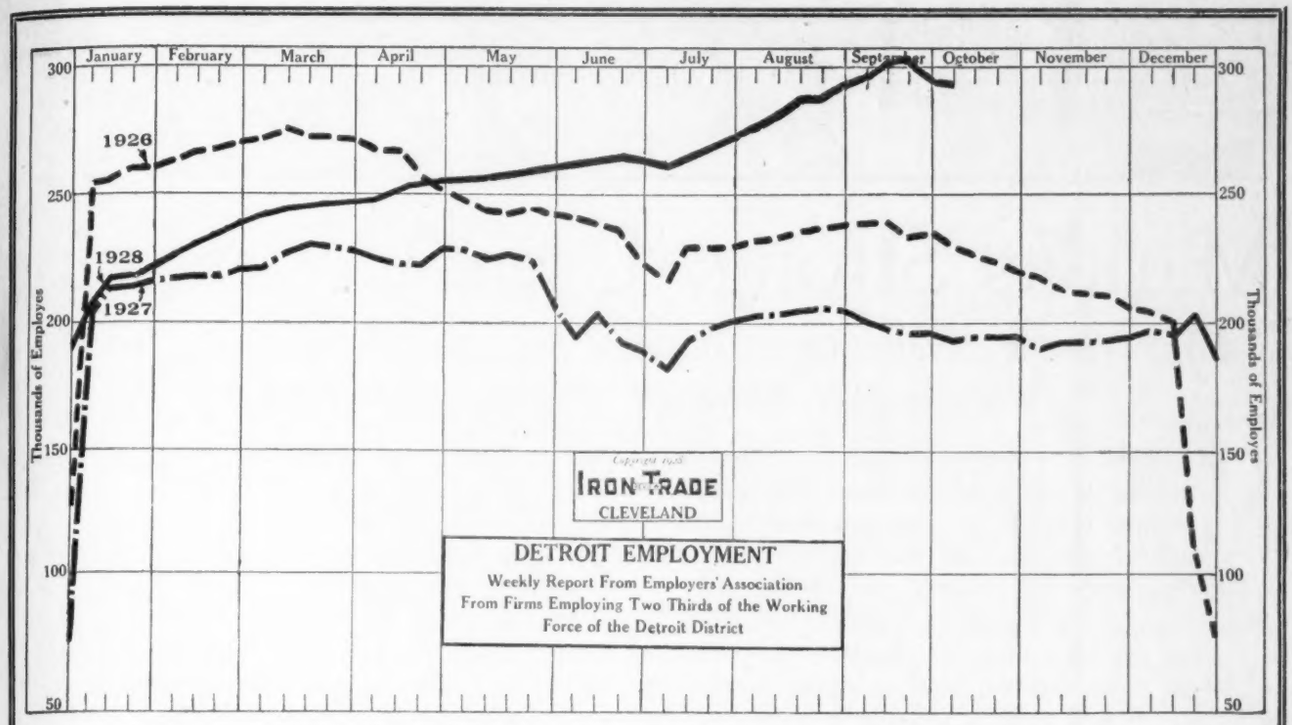
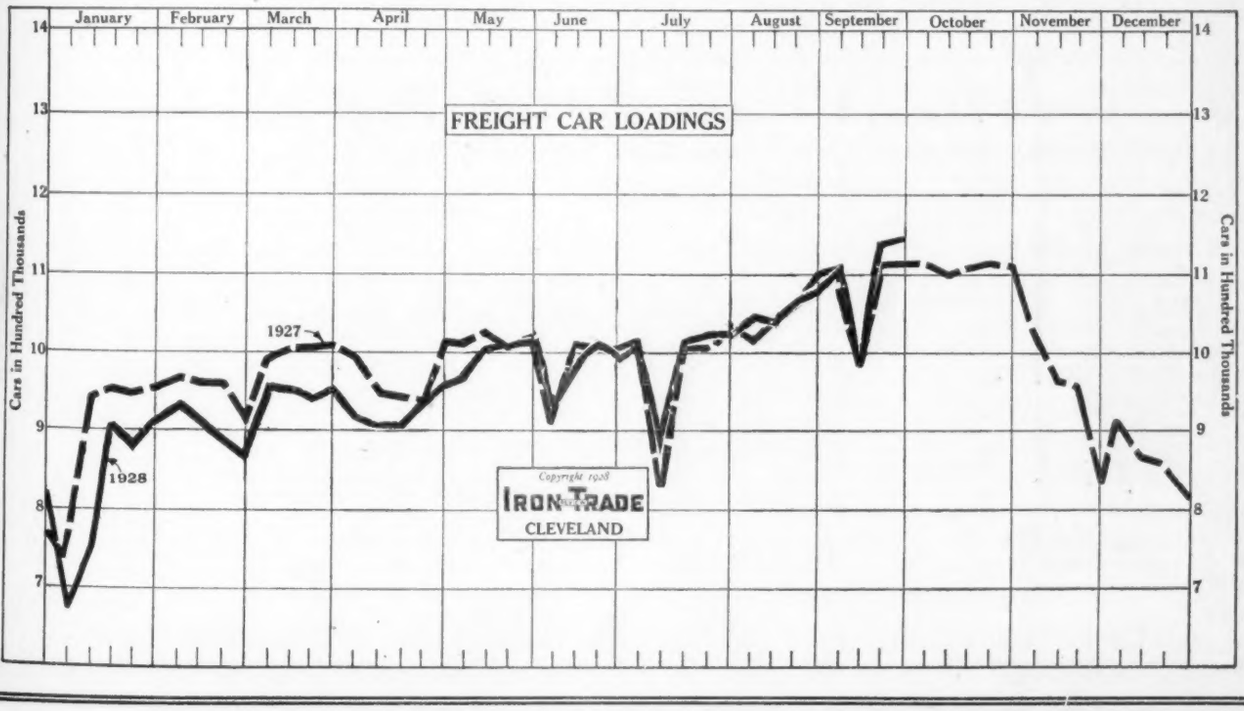


Detroit Employment

EMPLOYMENT in the Detroit district showed another decrease in the week ended October 2. Total payrolls were reported at 294,829, a decrease of 2724 below the preceding week and more than 6000 below the top figure for employment a few weeks ago. However, the total shows an increase of more than 100,000 over the corresponding period of 1927 and a record for a like period of any year. The decline indicates that the peak of employment has been passed.

Railroad Loadings

EVIDENCE of large scale industrial activity is found in the increasing volume of freight traffic. For the week ended September 22 carloadings totaled 1,143,214, the largest number of any single week of the year. The figure represents an increase of 5000 cars over the preceding week and one of 16,812 cars over the corresponding week last year. Large loadings of industrial products and of general merchandise account for the gain. For the year to date the volume of carloadings total 37,020,000 cars.



Markets Strong; Users Contracting

First Week of October One of Largest Sales Periods in Year—Delivery Dates Further Extended—Production Stepped Up

OCTOBER has started out with a remarkable display of price strength and vigorous consuming demand in iron and steel markets. The rush of specifications for various light and heavy finished steel products in the last half of September gave mills heavy backlogs, and further extended delivery periods. Despite the advance of $2 on some finished steel products for fourth quarter, the first week of October brought in more new business, at the higher figures, than any other week this year. Many orders held in abeyance pending a clearer definition of the price movement, were quickly released, and definite delivery periods demanded. As a result there is less uncertainty today than in weeks about the market, since contracting has become more general. The price gap between so-called preferred customers and regular buyers is closing. Mills and furnace operations show further moderate expansion for the week.

Pig Iron Requirements Continue Heavy

Pig iron shipments continue at a high rate, and show a tendency to exceed the September average, reflecting the increased output and larger melt. Shipments in the Chicago district in September totaled 300,000 tons. Substantial sales are being made for first quarter, at an average of 25 cents over present figures. A central Ohio steelworks closed in the past week for around 2500 tons of basic with a merchant stack at $16.50, valley, and for an equivalent tonnage at $17, valley, with another producer. This is believed to have removed the last of the $16.50 basic from the market, and $17 now is the more representative price.

Coke Market Showing More Life

Coke production in the Connellsville district has been expanded by the lighting of 1200 ovens, and the market is firmer. Gray iron foundries in eastern New York now are operating at 85 per cent, the best rate in years.

Steel ingot production set a new high record for the month of September, with 4,147,583 tons. The daily average was 165,903 tons, an increase of 11,144 tons over the August average of 154,759. August had two more working days than September,

Comparative Prices of Iron, Steel and Coke

Representative Market Figures for This Week, Last Month, Three Months and One Year Ago

	Oct. 10, 1928	Sept., 1928	July, 1928	Oct., 1927
PIG IRON				
Bessemer, del., Pittsburgh	$19.01	18.86	18.76	19.76
Basic, valley	17.00	16.10	15.95	17.00
Basic, eastern, del. eastern Pa.	19.65	19.00	19.00	19.50
No. 2 foundry, del., Pittsburgh	18.76	18.61	18.26	19.26
No. 2 foundry, Chicago	18.50	18.30	17.60	18.75
*Southern No. 2, Birmingham	16.25	16.25	15.50	17.25
*Southern Ohio, No. 2 Ironton	19.00	19.00	19.00	19.00
**No. 2X, Virginia furnace	20.50	20.50	20.50	21.50
**No. 2X, eastern, del. Phila	21.26	21.01	20.76	20.66
Malleable valley	17.25	17.10	17.00	17.50
Malleable, Chicago	18.50	18.30	17.60	18.75
Lake Superior charcoal, del. Chicago	27.04	27.04	27.04	27.04
Gray forge, val., del. Pittsburgh	18.26	18.01	18.76	18.76
Ferromanganese, del. Pittsburgh	109.79	109.79	109.79	94.79
*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.				
COKE				
Connellsville, furnace, ovens	2.75	2.75	2.60	2.85
Connellsville, foundry, ovens	3.75	3.75	3.50	3.75
SEMIFINISHED MATERIAL				
Sheet bars, open-hearth, Youngstown	33.00	33.00	33.00	34.00
Sheet bars, open-hearth, Pittsburgh	33.00	33.00	32.25	34.00
Billets, open-hearth, Pittsburgh	33.00	32.00	32.25	33.00
Wire rods, Pittsburgh	42.00	42.00	42.00	42.50

	Oct. 10, 1928	Sept., 1928	July, 1928	Oct., 1927
FINISHED MATERIAL				
Steel bars, Pittsburgh	1.95	1.90	1.85	1.75
Steel bars, Chicago	2.00	2.00	2.00	1.85
Steel bars, Philadelphia	2.27	2.22	2.17	2.07
Iron bars, Chicago	2.00	2.00	2.00	1.90
Shapes, Pittsburgh	1.95	1.30	1.85	1.75
Shapes, Philadelphia	2.11	2.06	2.01	2.07
Shapes, Chicago	2.00	2.00	2.00	1.85
Tank plates, Pittsburgh	1.95	1.90	1.85	1.75
Tank plates, Philadelphia	2.15	2.10	2.10	2.07
Tank plates, Chicago	2.00	2.00	2.00	1.85
Sheets, black, No. 24, Pittsburgh	2.70	2.65	2.65	2.95
Sheets, blue anl., No. 10, Pittsburgh	2.00	2.00	2.00	2.15
Sheets, gal., No. 24, Pittsburgh	3.50	3.50	3.50	3.80
Sheets, black, No. 24, Chicago	2.90	2.85	2.80	3.10
Sheets, blue anl., No. 10, Chicago	2.15	2.15	2.15	2.35
Sheets, galvanized, No. 24, Chicago	3.65	3.65	3.65	3.95
Plain wire, Pittsburgh	2.40	2.40	2.45	2.40
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55
Tin plate, per base box, Pittsburgh	5.25	5.25	5.25	5.30
SCRAP				
Heavy melting steel, Pittsburgh	17.00	16.55	14.10	14.50
Heavy melting steel, eastern Pa.	15.75	14.65	12.75	14.00
Heavy melting steel, Chicago	13.50	12.95	12.30	11.75
No. 1 wrought, eastern Pa.	15.50	15.10	15.25	15.75
No. 1 wrought, Chicago	13.25	12.95	12.30	11.40
Rails for rolling, Chicago	16.25	15.90	14.50	14.70

Current Prices for Rolled Steel Products

PRICES IN CENTS PER POUND UNLESS OTHERWISE INDICATED

STEEL PLATES

Pittsburgh	1.90c to 2.00c
Philadelphia, del.	2.15c to 2.25c
New York, del.	2.225c to 2.325c
Boston, del.	2.265c to 2.415c
Chicago	2.00c to 2.10c
Cleveland, delivered	2.09c to 2.19c
Buffalo	2.00c
Birmingham	2.15c
Pacific Coast, c.i.f.	2.20c to 2.30c

STRUCTURAL SHAPES

Pittsburgh	1.90c to 2.00c
Philadelphia, del.	2.11c to 2.18c
New York, del.	2.19c to 2.24c
Boston, del.	2.265c to 2.415c
Chicago	2.00c to 2.10c
Cleveland, delivered	2.09c to 2.19c
Buffalo	2.00c
Birmingham	2.15c
Pacific Coast, c.i.f.	2.35c

BARS

SOFT STEEL

Pittsburgh	1.90c to 2.00c
Chicago	2.00c to 2.10c
Birmingham	2.15c
Lackawanna, N. Y.	2.05c to 2.10c
Pacific Coast, c.i.f.	2.35c
Cleveland	1.90c to 2.05c
Philadelphia, del.	2.27c to 2.32c
New York, delivered	2.29c to 2.34c
Boston, delivered	2.265c to 2.415c
Pittsburgh, cold finishing	2.05c
Pittsburgh, forging quality	2.15c

RAIL STEEL

Chicago Heights	1.90c to 1.95c
Eastern mills	1.85c

IRON

Chicago	2.00c to 2.10c
New York, delivered	2.14c to 2.24c
Philadelphia, delivered	2.12c to 2.22c
Pittsburgh, refined	2.75c to 4.25c

REINFORCING

Pittsburgh billet, cut lengths	2.25c
Stock lengths from mill	2.00c
Chicago, billet	2.30c to 3.00c
Chicago, rail steel	2.00c to 2.60c
Chicago, rail steel, road and bridge work	1.85c to 1.95c
Philadelphia	2.47c to 2.57c

COLD FINISHED STEEL

Cold finished steel bars, drawn or rolled, Pitts., Chi., c.l.	2.20c
Shafting (turned, polished) Pittsburgh	2.20c
Shafting (turned, ground) mill (Depending on size, 1 3/16 to 7-inch)	2.55c to 3.00c
Cold finished steel bars, Cleve.	2.25c

TIN AND TERNE PLATE

Prices per 100-pound box Pittsburgh

*Tin plate, coke base	$5.25
Gary, Ind., base 10 cents higher.	
Long ternes, primes, No. 24	4.00c to 4.10c

*Price subject to quantity differentials.

SHEETS

SHEET MILL BLACK

No. 24, Pittsburgh base	2.65c to 2.75c
No. 24, Philadelphia, delivered	3.07c
No. 24, Gary, Indiana Harbor	2.85c
No. 24, Chicago, delivered	2.90c
No. 24, Birmingham, base	2.90c

TIN MILL BLACK

No. 28, Pittsburgh, base	2.90c
No. 28, Gary, base	2.95c to 3.00c

GALVANIZED

No. 24, Pittsburgh, base	3.50c to 3.60c
No. 24, Philadelphia, delivered	3.82c
No. 24, Gary, Indiana Harbor	3.60c
No. 24, Chicago, delivered	3.65c
No. 24, Birmingham, base	3.65c

BLUE ANNEALED

No. 10, Pittsburgh, base*	2.00c
No. 24, Philadelphia, delivered	2.32c to 2.42c
No. 10, Gary, Indiana Harbor	2.10c
No. 10, Chicago, delivered	2.15c
No. 10, Birmingham, base	2.15c

*Plus 0.10 cents for 45 inches or wider.

AUTOMOBILE

No. 20, Pittsburgh, base,	4.00c

FURNITURE

No. 24, Grade A, Pittsburgh	3.85c to 3.90c
No. 24, Grade B, Pittsburgh	3.65c to 3.70c

(Turn to the following page)

which gave August a total of 4,178,481 tons. Despite the fact September this year had one less working day than the same month last year, output this year was 878,702 tons larger. For the first nine months this year total ingot production was 36,930,520 tons, 3,151,568 tons ahead of the comparable period of 1927. Production this year in the same period has averaged 84.08 per cent of capacity, against 78.78 per cent last year.

Sales of bars and other finished steel products in the past week in the Middle West were heavier than those of any prior week this year. Sales, specifications and shipments of all finished steel products during the first nine months this year are about 20 per cent ahead of the comparable period of 1927. Capacity operations are reported by bar mills, and deliveries are deferred three to six weeks. Farm implement and tractor manufacturers have figured as larger buyers.

Demand for Sheets Is Well Sustained

While consumption of automotive sheets is on a rising scale, and some makers are already figuring on tonnage for new models, unusual vitality of the sheet market appears due to sustained demand from a diverse line of users. Specifications tend to increase in volume. The leading interest is operating its sheet departments practically full. Western structural shape mills increased their operating rate 5 points to 80 per cent in the past week, largely under the influence of railroad requirements. Shape awards and inquiries for railroad bridges and car equipment at Chicago call for 50,000 tons of shapes, in addition to a heavy tonnage of plates. Featuring shape awards in the week are 3400 tons for a Y. M. C. A. building in New York, 2000 tons for a Memphis office building, and 1800 tons for an exhibition building in St. Louis. Bids are being taken on 6700 tons for a section of the Bronx subway, while at Buffalo the new municipal building project has become an early prospect for 8000 tons. A larger volume of oil tank work is appearing in the plate market, especially from the Pacific coast.

Railroad Business Shows Improvement

Railroad business shows further expansion. A trunk line has placed 46,000 tons of rails, 30 per cent going to western mills. The Pennsylvania's maximum fourth quarter requirements now up for consideration have been increased by around 70,000 tons to a total of 272,000 tons. Preliminary estimates of total car awards in September indicate 1406, more than double those of August. New inquiries call for 3800 freight cars for various lines, while the Louisville & Nashville may place 2000. Lehigh Valley has decided to scrap 4700 wooden freight cars in line with the American Railway association's policy to restrict the use of such cars. While scrap continues scarce and a few further advances have been made in some grades changes are slower and less impressive. IRON TRADE REVIEW'S composite of 14 leading iron and steel products is up 12 cents this week to $35.42.

Composite Market Average

Based on Pig Iron, Billets, Slabs, Sheet Bars, Wire Rods, Steel Bars, Plates, Structural Shapes, Black, Galvanized and Blue Annealed Sheets, Tin Plate, Wire Nails and Black Pipe

This week (Oct. 10, 1928)	$35.42
Last week Oct. 3, 1928)	35.30
One month ago (September, 1928)	35.19
Three months ago (July, 1928)	34.91
One year ago (October, 1927)	35.67
Ten years ago (October, 1918)	57.53
Fifteen years ago (October, 1913)	24.91

Current Rolled Steel Prices

PRICES IN CENTS PER POUND UNLESS OTHERWISE INDICATED
SEE ALSO PRECEDING PAGE

HOOPS, BANDS, STRIPS

Hot strip, under 3-inch, Pitts. 2.10c to 2.20c
Hot strip, 3 to 6-inch, Pitts. 2.00c to 2.10c
Hot strip, 6 to 12-inch, Pitts. 1.80c to 1.90c
Hot rolled strip, 12 to 24-inch 16 gage and heavier, coils or cut length, 1.90c to 2.00c plate basis, or 2.00c blue annealed basis.
Hot strip, bands, under 3-in. Chicago 2.30c
Hot strip, bands, 3 to 6-in., Chi. 2.20c
Hot strip, bands, 3 to 12-in., Chi. 1.85c to 2.00c
Hot strip, 12 to 24 in., Chi.... 2.10c blue annealed sheet basis.
Cold rolled strip, hard coils, 16 inches and wider by 0.100-inch and heavier, base Pitts., Cleve., (3 tons and over)..... 2.75c to 2.85c
Worcester, Mass. (3 tons and over) ..... 3.00c to 3.10c
Quantity extras: 5999 to 2000 pounds, 0.25c; 1999 to 1000 pounds, 0.65c.

ALLOY STEEL

Hot Rolled
F.o.b. Mills
Alloy Quality Bar Base is 2.75c

S.A.E. Series Number	Alloy differential	Net, 100 lb. bars
2000	0.25	$3.00
2100	0.55	3.30
2300	1.50	4.25
2500	2.25	5.00
3100	0.55	3.30
3200	1.35	4.10
3300	3.80	6.55
3400	3.20	5.95
4100 0.15-0.25 Mo.	0.50	3.25
4100 0.25-0.40 Mo.	0.70	3.45
4600 0.20-0.30 Mo. 1.25-1.75 Ni.	1.05	3.80
5100 0.60-0.90 Cr.	0.35	3.10
5100 0.80-1.10 Cr.	0.45	3.20
5100 Chrome Spring	0.20	2.95
6100 Bars	1.20	3.95
6100 Spring Steel	0.95	3.70
Chrome Nickel Vanadium	1.50	4.25
Carbon Vanadium	0.95	3.70
9250	0.25	3.00

TUBING

Boiler
Carload Discounts—Less-carloads 4 points Lower—F.o.b. Pittsburgh Mills
Steel 3¼ to 3¾-inch 42½
Charcoal iron, 3¼ to 4½-inch 9
Seamless hot rolled 3¼ to 3½-inch.... 56
Further discounts of six 5 per cents for 21,000 pounds or more on lap welded steel. On charcoal two 10's and one 2½ on 12,000 pounds or more.

COLD DRAWN SEAMLESS
F.o.b. mill in desirable quantities
Random length over 5 feet .....55 per cent
Selected lengths, 1 to 18 feet .....53 per cent

WIRE PRODUCTS

To Jobbers in Carloads
F.o.b. Cleveland and Pittsburgh base
Dealers 10 cents per 100 pounds extra

Bright plain wire, No. 9 gage.. 2.40c
Annealed fence wire 2.55c
Galvanized wire, No. 9 gage.... 3.00c
Barbed wire, painted 2.95c
Barbed wire, galvanized 3.20c
Per 100 lbs.
Wire nails $2.55
Galvanized nails, plus differ. 4.55
Polished staples 3.00
Galvanized staples 3.25
Coated nails, 100 lb. kegs, Sept. 1, 1926 extras apply.... 2.55
Woven wire fencing (retailers) 12½ gage, 26-in. high, 7-in. bars and 12-in. stays, per 100 rods, f.o.b. Pitts $20.03

Joliet, DeKalb and Waukegan, Ill., Anderson, Ind., and Chicago prices $1 per ton over Cleveland-Pittsburgh base on products made there; Duluth $2 higher, Worcester, Mass., and Fairfield, Ala., $3 higher.

CAST IRON WATER PIPE

Prices per net ton
Class B Pipe

Six-inch and over, Birming'm $34.00 to 35.00
Four-inch, Birmingham ..... 38.00 to 39.50
Four-inch, Chicago ..... 46.20 to 47.20
Six-inch to 24-inch, Chicago..... 42.20 to 43.20
Four-inch, New York ..... 40.50 to 41.60
Six-inch and over, New York 37.60
Standard fittings, Bir. base..... $100.00

Six to 24-inch base; over 24-inch; plus $20; 4-inch, plus $10; 3-inch, plus $20; gas pipe fittings, $5 higher.
Class A pipe is $4 higher than Class B.

IRON AND STEEL PIPE

Base Discounts Pittsburgh and Lorain, O., to Jobbers in Carloads

	Black	Galv.
1 to 3-inch butt steel*	62	50½
1 to 1½-inch butt iron	30	13

Indiana Harbor, Ind., and Evanston, Ill., 2 points less, Chicago del., 2½ points less.
*To large jobbers these discounts are increased on black by 1 point and a supplementary discount of 5 per cent on galvanized by 1½ points with a supplementary 5 per cent.

CHAIN, PILING, CUT NAILS

Cut nails, c.l., f.o.b. mills..... 2.70c
Cut nails, l.c.l. f.o.b. mills..... 2.80c
Chain, 1-in., proof coil, Pitts.... 6.00c
Sheet piling base, Pittsburgh.. 2.25c

RAILS, TRACK MATERIAL

Standard bessemer rails, mill $43.00
Standard open-h'th rails, mill $43.00
Relaying rails, St. Louis.....$24.00 to 31.00
Relay rails, Pitts. 60 to 90 lb...$22.00 to 27.00
Light rails, 25 to 45, mills..... $36.00
Angle bars, Chicago base..... 2.75c
Spikes, railroad, Pittsburgh.... 2.80c
Spikes, small railroad, 7/16-inch and smaller, Pitts..... 2.80c
Spikes, boat and barge, Pitts. 3.00c
Spikes, railroad, Chicago 2.80c
Track bolts, Pitts., steam roads 3.80c
Track bolts, Pitts., stand, jobbers ..... 70 off list
Track bolts, Chicago 3.80c
Tie plates, Chicago, Pitts..... $43.00

BOLTS AND NUTS

Birmingham and Chicago
Discounts are for legitimate jobbing or large consuming trade purchasing in full-case lots, apply to lists of April 1, 1927.
Small lots are 55 to 60 per cent off.

CARRIAGE BOLTS
All sizes, cut thread .....60 to 70 off
Rolled thread ⅝x6 and smaller take 10 per cent lower list.
Eagle list ..... 60 to 70 off

MACHINE BOLTS
All sizes, cut thread ..... 60 to 70 off
Rolled thread ⅝x6 and smaller take 10 per cent lower list.
Lag screws ..... 60 to 70 off
Plow bolts, Nos. 1-2-3-7 heads 60 to 70 off
Tap bolts ..... 60 to 70 off
Blank bolts ..... 60 to 70 off
Stud bolts without nuts ..... 60 to 70 off
Stove bolts, 75, 20, 10 and 5 off in pkgs., 75, 20, 10 and 5 with 2½ off in bulk.
Tire bolts .....60-5 off

Nuts
Semifinished .....60 to 70 off

HEXAGON CAP SCREWS
Milled .....80-10-10 off
Upset 1 in. diam. and smaller.....85-5 off

SQUARE HEAD SET SCREWS
Milled .....80-10 off
Upset 1 in. diam. and smaller.....80-10-10 off

RIVETS

Struct., c.l., Pitts.-Cleve..... 2.80c to 2.90c
Structural, c.l., Chicago 3.00c
**7/16-inch and smaller, Pitts.....70 and 10 off
Chi., Cleve. .....70 to 70 and 10 off
**Some makers quoting 70 off with freight allowed on 300 pounds or more.

WASHERS

Wrought, c.l., Pitts. dist.....$6.50 to 6.75 off
Wrought, c.l., Chicago dist.....$6.70 to 6.90 off
Lock: To dealers .....85-5 off
Lock: To consumers .....85 off

Raw Materials and Semifinished Products

SEMIFINISHED MATERIAL

Prices Per gross ton

BILLETS AND BLOOMS
4 x 4-inch base

Pittsburgh, open-hearth .....$33.00 to 34.00
Pittsburgh, bessemer ..... 33.00 to 34.00
Youngstown 32.00
Cleveland 33.00
Philadelphia 38.30
Chicago 33.00
Forging, Chicago 38.00
Forging, Pittsburgh 38.00
Forging, Philadelphia 43.30

SHEET BARS
Pittsburgh $38.00
Youngstown 33.00
Cleveland ..... 32.50 to 33.00
Chicago 34.00

SLABS
Pitts., Young., and Cleve.....$33.00 to 34.00

WIRE RODS
Pittsburgh, Cleveland $42.00
Chicago 45.00

SKELP
All grades, Pitstburgh ..... 1.85c to 1.90c

IRON ORE

LAKE SUPERIOR ORE
Per Gross Ton, Lower Lake Ports
Old range bessemer, 51½% $4.55
Mesabi bessemer, 51½% 4.40
Old range nonbessemer 41½% 4.40
Mesabi nonbessemer, 51½%..... 4.25

EASTERN LOCAL ORES
Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces
Foundry and basic, 56-63% 8.00
Copper free low phosphorus 58 to 65 per cent ..... nominal

FOREIGN ORE
Cents per unit, alongside docks, Atlantic ports
Foreign manganiferous ore, 45-55% iron, 6-8% manganese.. 10.50 to 11.00
North African low phosphorus 10.00 to 11.00
Swedish foundry or basic, 65%—none offered
Spanish and North African basic, 50 to 60 per cent ..... 8.50 to 9.00
Newfoundland foundry, 55%.... 8.50

MANGANESE ORE

Prices do not include duty of 1 cent per pound of metallic manganese contained.
Brazilian .....36 to 38 cents
Indian .....35 to 38 cents
Caucasian (53-55 per cent) ....38 to 40 cents

FLUORSPAR

85 and 5 per cent grade
Washed gravel, Kentucky and Illinois mines, per net ton....$16.50 to 17.00
Washed gravel, imported duty paid, east, tidewater, net ton $15.25 to 15.75

REFRACTORIES

FIRE CLAY BRICK
Per 1000 f.o.b. works

First Quality
Pennsylvania .....$43.00 to 46.00
Ohio ..... 43.00 to 46.00
Illinois ..... 43.00 to 46.00
Kentucky ..... 43.00 to 46.00
Missouri ..... 43.00 to 46.00
Maryland ..... 43.00 to 46.00
Georgia and Alabama ..... 40.00 to 45.00

Second Quality
Pennsylvania ..... 35.00 to 38.00
Ohio ..... 35.00 to 38.00
Illinois ..... 35.00 to 38.00
Kentucky ..... 35.00 to 38.00
Missouri ..... 35.00 to 38.00
Maryland ..... 35.00 to 38.00
Georgia and Alabama ..... 30.00 to 35.00

SILICA BRICK
Pennsylvania 43.00
Joliet, Ill., East Chicago, Ind.... 52.00
Brimingham ..... 50.00 to 51.00

MAGNESITE BRICK
Per Net Ton
9 x 4½ x 2½ 65.00

MAGNESITE
Net Ton Chester, Pa., and Baltimore base
Dead-burned grain magnesite.... 40.00

CHROME BRICK
Net Ton Chester, Pa., and Baltimore base
9 x 4½ x 2½ 45.00

Pig Iron

More Interest in First QuarterRequirements —Market Strong—Shipments Heavy—Basic Up, Following Sale at $16.50

WHILE shipments of pig iron continue at the high average rate of September, in some instances exceeding it, new orders are fairly active, and the market is featured by increasing interest in requirements for first quarter. Competition is figuring in business for next year, and the price advances contemplated by some furnace interests for that period, are not being observed as rigridly as expected. Some makers were asking 50 cents more than present levels, but orders have been booked at current figures. Of 32,000 tons booked by furnace interests at Cleveland in the past week 10,000 tons is for first quarter delivery. Following a substantial sale of basic at $16.50, valley, by a merchant interest the seller is now out of the market and $17 is minimum.

PITTSBURGH, Oct. 9.—Pig iron is in a quiet market. The recent spurt in basic has not been followed by the appearance of large inquiries, although it is believed a number of mills may quietly seek additional supplies soon. Sellers are not forcing sales, due to the fact that many have little or no basic to dispose of and are content to await future developments. Some steelworks that usually are sellers are forced by the active rate of consumption to withdraw from the market. On inquiry that is appearing $17, valley, generally is quoted. Foundry iron is quiet. Activity is restricted to a few carloads at a time. No opposition is met to the $17 base, valley, price. Shipments against contracts are moving well. Little change is noted in bessemer or malleable, $17.25, valley, generally representing minimum figures on both grades, with neither active.

Boston, Oct. 9.—Approximately 4000 tons of pig iron was sold in the past week. About 2000 tons was Buffalo and Indian iron. Practically all of the buying consisted of tonnage for mixture purposes.

New York, Oct. 9.—Despite the fact that most consumers in this territory some time ago bought their fourth quarter requirements, the heavy consumption is bringing out additional tonnage. Sales of foundry iron in this territory during the past week aggregated over 7500, mainly for prompt shipment. Prices continue firm at $17, base, Buffalo, as far as this territory is concerned. Eastern Pennsylvania foundry iron continues at $20, base, furnace, but not much of it is being marketed in this territory. The price of Dutch foundry iron has been marked up 25 cents a ton and now is quoted at $21.25, duty paid, tidewater. Indian foundry iron is unchanged at $20.50, duty paid, tidewater. A cargo of 2400 tons of Dutch iron has arrived at Bridgeport, Conn., and already has been distributed to consumers in that district.

Buffalo, Oct. 9.—New pig iron slow. Specifications and shipments are good and prices steady. The Hanna Furnace Co.'s new stack is now in full production, relieving shortage of some grades of merchant iron.

Cleveland, Oct. 9.—Firm prices, heavy shipments, and some sales for first quarter feature the pig iron market. Furnace interests with headquarters in Cleveland booked 32,000 tons of all grades during the past week, compared with 26,000 tons in the preceding week. Close to 10,000 tons is for first quarter. A large share of the first quarter tonnage was placed by melters in southern Michigan. The price situation for first quarter is not entirely clarified, for while some furnace interests had intended asking 50 cents over present figures for that period the advance in all instances has not measured up to that. Some orders have been booked at present levels, and some at an advance of 25 cents, depending on destination and competition. An advance of 50 cents has applied on some orders for first quarter booked at Buffalo. The current Cleveland price is $17.50, base, furnace, for outside shipment, and $18, base, for delivery in the local 50-cent switching area. The market in lower Michigan is $18 to $18.50.

A price of $16.50, valley, applied on approximately 2500 tons of basic sold late last week by a merchant furnace interest to a central Ohio alloy steel producer. The same consumer purchased about 4000 tons additional at $17, valley. The seller who had basic at $16.50 is out of the market for that grade, and $17 now is the representative price.

Cincinnati, Oct. 9.—Pig iron buying turned upward the past week, sales having totaled about 6000 tons. Most of the orders were for malleable iron and the two largest transactions were for 2500 tons and 2000 tons respectively. Aside from an inquiry from an Indiana company for 500 tons of foundry iron, pending business is negligible. Meanwhile, prices are firm with southern iron selling at $16.25, base, Birmingham, and nothern Ohio iron quoted at $17.50, base, furnace.

Chicago, Oct. 9.—Stocks of pig iron in melters' yards are said to be the lowest on record in the market territory tributary to Chicago district furnaces. Melters are pressing furnace interests for deliveries, as they have been operating on unusually close margins of supplies. Estimates are that September shipments were close to 300,000 tons. A steelworks furnace sold some merchant iron direct. Part of an accumulation of 12,000 to 15,000 tons of off basic iron in a steelworks furnace yard may be shipped this month as foundry iron to users who can assimilate the particular analysis in their mixtures. Spot selling is active, and several tonnages have been closed for first quarter. The price is holding firm at $18.50, base, Chicago furnace.

Interest in pig iron for first quarter is sustained, but no active buying movement has developed. A western Michigan melter is inquiring for 3000 to 4000 tons for first quarter.

St. Louis, Oct. 9.—Purchasing of pig iron has slowed down, but the market

(*Concluded on Page* 949)

Pig Iron Prices

Per Gross Ton

Bessemer, valley furnace	$17.25 to 17.50
Bessemer, del. Pittsburgh	19.01 to 19.26
Basic, valley furnace	17.00
Basic, del. Pittsburgh	18.76
Basic, Buffalo furnace	17.00
Basic, del. eastern Pa.	19.65 to 25.00
Malleable, valley furnace	17.25 to 17.50
Malleable, del. Pittsburgh	19.01 to 19.26
Malleable, del. Cleveland	18.50
Malleable, Chicago furnace	18.50
Malleable, Buffalo furnace	18.00
Malleable, del. eastern Pa.	20.50 to 21.00
No. 1 foundry, Chicago furnace	19.00
No. 1X, eastern del., Phila.	21.76
No. 1X, Buffalo furnace	19.00
No. 2 foundry, valley furnace	17.00
No. 2 foundry, del. Pittsburgh	18.76
No. 2 plain, Buffalo furnace	17.50
No. 2 foundry, Chicago furnace	18.50
No. 2 foundry, Granite City	19.50 to 20.00
No. 2 foundry, Ironton furnace	19.00
No. 2 foundry, del. Cleveland	18.50
No. 2 plain, del., Phila.	20.76
No. 2 plain, Virginia furnace	20.00
No. 2 plain, N. J., tidewater	20.01 to 21.28
No. 2 Alabama, Birmingham	16.25
No. 2 Alabama, del. Cincinnati	19.94
No. 2 Tenn., Birmingham base	16.25
No. 2 Tenn., del. Cincinnati	19.94
No. 2 Alabama, del. Chicago	22.26
No. 2 Alabama, del. Cleveland	22.51
No. 2 Alabama, del. St. Louis	20.67
No. 2X, east, N. J., tidewater	20.51 to 21.78
No. 2X, eastern, del. Phila.	21.26
No. 2X, foundry, Buffalo furnace	18.00
No. 2X, eastern, del. Boston	20.91 to 21.41
No. 2X, Virginia furnace	20.50
Gray forge, val., del. Pittsburgh	18.26
Low phos., standard, valley	26.50 to 27.00
Low phos., standard, Phila	24.26 to 24.76
Low phos. copper bearing fur.	23.00 to 23.50
Charcoal, Birmingham	28.00
Charcoal, Superior, del., Chicago	27.04

CANADIAN PRICES

No. 2 foundry, del. Toronto	23.60
No. 2 foundry, del. Montreal	25.00
Malleable, del. Toronto	23.60
Malleable, del. Montreal	25.00
Basic, del. Montreal	24.00

Silvery iron, Jackson county (Ohio) furnace in per cents: 5—$22; 6—$23; 7—$24; 8—$25; 9—$26; 10—$28; 11—$30; 12—$32; 13—$34.

Bessemer ferrosilicon, Jackson county (Ohio) furnace, in per cents: 10—$30; 11—$32; 12—$34; 13—$36; 14—$38; 15—$40.50; 16—$43.

Coke

Foundry and Furnace Fuel Shipments Show Improvement—Prices Are Firm

FOUNDRY coke shipments continue to show improvement. In the New York district gray iron foundries are operating at about 85 per cent, the highest rate in years, and this is reflected in larger fuel shipments. Specifications in other districts also are more liberal. Consumption of furnace coke is gaining, with the recent addition to the number of active stacks. Prices are steady.

Pittsburgh, Oct. 9.—The tone of the beehive coke market is slightly improved. Shipments against contract of furnace and foundry grades are well maintained, with some increase in the movement of the latter. Spot buying is light, with a little extra coke available. The Jones & Laughlin Steel Corp. has extended its contract for additional supplies of furnace fuel, in effect since July, to the end of October. Another steel mill is understood to be inquiring for an unstated tonnage. More sales of furnace coke were made recently at $2.85, although $2.75 still rules in most transactions. Foundry fuel is selling at $3.75, minimum, with better grades commanding $1 and more higher. Domestic heating coke is moving freely. The H. C. Frick Coke Co. is firing up 535 ovens in the Connellsville district, in addition to 657 lighted last week.

Production of coke in the Connellsville region for the week ended Sept. 29 was 39,320 tons, compared with 36,490 tons the preceding week, according to the *Connellsville Courier*.

Boston, Oct. 9.—Coke production is being increased. Stock piles are being reduced at the rate of 2000 tons a week. The demand from foundries continues heavy, and producers are behind on orders. Prices are steady.

New York, Oct. 9.—Specifications on foundry coke contracts continue active. Gray iron foundries in this territory are operating at about 85 per cent of normal, which is the best rate in this territory in years. In view of the extent to which the trade is covered by contracts, spot buying of foundry coke is limited. Prices on beehive foundry coke continue $3.75 to $4.25, Connellsville, and $4.85, Latrobe. On by-product foundry coke the market continues unchanged at $9 to $9.40, delivered at Newark, N. J., and $11 delivered at representative New England consuming points.

Cincinnati, Oct. 9.—Coke consumers are specifying liberally against current contracts with the result that shipments this month are showing a gain over those of September. Present indications are that the demand for by-product foundry coke this month will carry shipments to a point from 10 to 15 per cent ahead of the previous month. There also are signs of increasing activity in domestic grades. Movement of foundry coke from the New River and Wise county districts continues fair in volume.

St. Louis, Oct. 9.—By-product coke producers report specifications on contracts in satisfactory volume. With certain melters, notably stove, implement and certain jobbing foundries, ordering has been in larger volume than usual at this time of year. Some contracting for fourth quarter is reported, but most melters are buying what they need from month to month. Prices are firm.

Birmingham, Ala., Oct. 9.—Continued activity at the by-product coke works reflects a steady market. Many industries using coke are speeding up production. Prices are firm.

Coke Prices

Prices per Net Ton

Beehive Ovens	
Connellsville furnace	$2.75 to 3.00
Connellsville foundry	3.75 to 4.85
New River foundry	6.50 to 7.00
New River furnace	6.50
Wise county foundry	4.50 to 5.25
Wise county furnace	3.75 to 4.25
By-Product Foundry	
Newark, N. J., del.	9.00 to 9.40
Chicago, ovens	8.00
New England, del.	11.00
St. Louis, del.	9.00
Birmingham	5.00
Indianapolis, del.	8.25
Ashland, Ky.	7.00
Portsmouth, O.	7.00
Detroit, ovens	8.50
Buffalo, ovens	9.00

Ferroalloys

Ferromanganese In Active Demand—English Spiegeleisen Sold

New York, Oct. 9.—Active demand for shipments on contracts continues to feature the ferromanganese market. In view of the fact that consumers generally are covered by contracts, there is no new buying of importance. The price of ferromanganese continues $105, duty paid, tidewater. Heavy demand for shipments also is reflected in the spiegeleisen market. The market on spiegeleisen of the 19 to 21 per cent grade continues $33 furnace. Occasional sales of English spiegeleisen continue to be made in the United States. There have been some sales of English metal at $33, duty paid, tidewater, to consumers who can take New Orleans delivery, and there have been sales of high manganese English spiegeleisen at $35, duty paid, tidewater, for both 24 to 26 and 26 to 28 per cent.

Pittsburgh, Oct. 9.—Ferroalloy specifications so far this month are continuing at the rate which held during September, when total tonnage showed a fair increase over that of August. Sustained steelmaking rates have forced mills to specify considerably heavier than a year ago, when production was on a substantially reduced scale. Current buying of 78 to 82 per cent ferromanganese carries a $105, duty paid seaboard, price. The contract quotation for 50 per cent ferrosilicon continues at $83.50 in car lot orders. Occasional carloads of gravel fluorspar are being placed, with $17, f.o.b. mines, generally prevailing. Specifications for spiegeleisen are well maintained and show a gain over the rate of two months ago, reflecting increased blast furnace operations. Spiegeleisen continues at $33 a ton for 19 to 21 per cent material.

Offers Evening Course

Cleveland Engineering society, 1220 Huron road, Cleveland, will offer an evening course in modern machining methods and costs, beginning Oct. 22, and available to anyone interested in the subject. The course will consist of 14 sessions held in the rooms of the society. At each session a different type of machining operation will be studied, each evening's instruction being given by representatives of manufacturers of the machinery studied that evening. T. F. Githens will direct the work.

Will Speak at Meeting

George H. Charls, president of the National Association of Flat Rolled Steel Manufacturers, Cleveland, will address a meeting of the Pressed Metal institute in Buffalo, Friday afternoon, Oct. 12.

National, state and local taxes of American railroads average $42,935 per hour.

Ferroalloy Prices

Ferromanganese, 78 to 82 per cent tidewater, duty paid	$105.00
Ferromanganese, del. Pittsburgh	109.79
Spiegeleisen, 19 to 21 per cent domestic furnace	33.00
*Ferrosilicon, 50 per cent, freight allowed, carloads	83.50
*Do., less carload	88.50
Do., 75 per cent	130.00 to 150.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. per lb. con., del.	11.00
Do., for spot delivery	11.50
Ferrotungsten, stand., lb. cont.	96.00
Ferrovanadium, 30-40 per cent, per lb., contained, on analysis	3.15 to 3.65
Ferro-carbon-titanium carload, producers plant, net ton	200.00
Ferrophosphorus, per ton, carload, 17 to 19 per cent, Rockdale, Tenn., basis (18 per cent)	91.00
Ferrophosphorus, electrolytic, per ton, carload, 23-25% f.o.b. Anniston, Ala. (24 per cent)	122.50

*These prices contract; spot $5 higher.

Scrap

Continued Rise in Prices Follows Scarcity and Better Demand From Melters

IRON and steel scrap prices continue to move to higher levels, by gradual degrees. Scarcity of various grades is developing in most consuming centers and dealers who sold short are taking losses in filling contracts. Railroad and other offerings are not sufficient to replace shipments from yards.

Chicago, Oct. 9.—Heavy melting steel at $13.50 to $14, gross on tracks in the Chicago switching district, has reached the highest accepted consumer price since August, 1926. This quotation was established on the strength of a sale of about 15,000 tons to a leading consumer at $14. The iron and steel scrap market still trends upward, although a combination of selling in certain grades and some consumer resistance to prices has served to deflect the upward course in several items. Dealers are taking more orders at the higher prices but are moving cautiously, taking the long position on certain items and selling short on others. Production of scrap is at a good rate. Railroad scrap offerings are light, and dealers' yards are bare of prepared scrap, while consumption is growing. Gary mills have been coming into the market, which tends to strengthen prices.

New York, Oct. 9.—Bidding among dealers here has advanced prices on several grades of scrap 25 cents to $1 a ton. Grate bars and city wrought scrap were particularly affected. Yard steel for eastern consumption made a substantial advance, now holding at $9

Iron and Steel Scrap Prices

Corrected to Tuesday noon. Gross tons delivered to consumers, except Detroit where dealers' buying prices are shown

Steel Works Scrap

HEAVY MELTING STEEL

Birmingham	$10.00 to 10.75
Boston, dealers	10.25 to 10.75
Buffalo, No. 1	15.50 to 16.50
Buffalo, No. 2	13.00 to 13.50
Chicago	13.50 to 14.00
Cincinnati, deal.	13.50 to 14.00
Cleveland, No. 1	13.75 to 14.25
Cleveland, No. 2	13.00 to 13.50
Detroit, No. 1	12.00 to 12.50
Eastern Pa.	15.50 to 16.00
Eastern Pa. No. 2	12.50 to 13.50
Bethlehem deliv.	14.00
N. Y., deal., R. R.	11.50 to 12.00
N. Y., deal., yd.	9.00 to 9.50
Pittsburgh, No. 1	17.00
St. Louis, No. 1	13.00 to 13.50
St. Louis, No. 2	12.25 to 12.75
Valleys, No. 1	15.50 to 16.00

COMPRESSED SHEETS

Buffalo	13.50 to 14.00
Chicago	11.75 to 12.25
Cleveland	13.00 to 13.50
Detroit	12.00 to 12.50
Pittsburgh	17.00
Valleys	15.50 to 16.00
E. Pa. new mat.	13.00

BUNDLED SHEETS

Buffalo	10.50 to 11.00
Cincinnati, deal.	10.50 to 11.00
Cleveland	12.00 to 12.50
Eastern Pa.	11.50 to 12.00
Pittsburgh	14.25 to 14.75
St. Louis	8.00 to 8.50

SHEET CLIPPINGS, LOOSE

Chicago	7.50 to 8.00
Cincinnati	9.50 to 10.00
Detroit	8.00 to 8.50
St. Louis	8.00 to 8.50

STEEL RAILS, SHORT

Birmingham	10.50 to 11.00
Boston	8.25 to 8.75
Buffalo	16.50 to 17.50
Chicago	17.00 to 17.50
Cincinnati, deal.	18.25 to 18.75
Detroit	14.50 to 15.00
St. Louis	16.50 to 17.00

STOVE PLATE

Birmingham	13.00 to 13.50
Boston consumers	10.50 to 12.50
Buffalo	14.25 to 14.75
Chicago, net	11.50 to 12.00
Cinn., deal., net	10.50 to 11.00
Cleveland	9.00 to 9.25
Detroit, net	10.75 to 11.25
Eastern Pa.	12.50 to 13.00
N. Y., deal., mill	8.75 to 9.25
Pittsburgh	11.50 to 12.00
St. Louis	12.00 to 13.00

SHOVELING STEEL

Chicago	13.50 to 14.00
Pittsburgh	12.50 to 13.00
St. Louis	12.75 to 13.25

ENUCKLES, COUPLERS SPRINGS

Buffalo	16.00 to 18.00
Chicago	15.50 to 16.00
Eastern Pa.	17.00 to 17.50
Pittsburgh	18.50 to 19.50
St. Louis	14.00 to 14.50

LOW PHOSPHORUS

Buffalo, billet and bloom crops	21.00 to 21.50
Cincinnati, deal.	13.50 to 14.00
Eastern Pa.	17.50 to 18.50
Pitts. billet and bloom crops	21.00 to 21.50
Cleve. billet and bloom crops	17.00 to 17.50

FROGS, SWITCHES, GUARDS

Chicago	15.00 to 15.50
St. Louis	14.00 to 14.50

ANGLE BARS—STEEL

Buffalo	14.00 to 14.50
Chicago	16.00 to 16.50
St. Louis	13.25 to 13.75

Iron Mill Scrap

RAILROAD WROUGHT

Birmingham	9.50 to 10.00
Boston, dealers	10.50 to 11.00
Buffalo, No. 1	11.50 to 12.00
Buffalo, No. 2	15.00 to 15.50
Chicago, No. 1	13.25 to 13.75
Chicago, No. 2	13.50 to 14.00
Cinn., No. 2	13.50 to 14.00
Eastern Pa.	15.00 to 16.00
N. Y., No. 1 deal.	11.50 to 12.00
Pittsburgh, No. 1	13.50 to 14.00
Pittsburgh, No. 2	17.00
St. Louis, No. 1	11.50 to 12.00
St. Louis, No. 2	12.75 to 13.25

WROUGHT PIPE

Boston, dealers	9.00 to 9.50
Eastern Pa.	14.00 to 14.50
Buffalo	12.00 to 12.50
New York, deal.	10.25 to 10.75

YARD WROUGHT

Boston	8.00 to 8.50
Eastern Pa.	15.00 to 15.50

BUSHELING

Buffalo	14.00 to 15.00
Chicago, No. 1	11.00 to 11.50
Chicago, No. 2	8.50 to 9.00
Cinn., No. 1 deal.	10.75 to 11.25
Cinn., No. 2	6.50 to 7.00
Cleveland, No. 2	10.25 to 10.50
Detroit, No. 1	10.50 to 11.00
Detroit, mixed	7.25 to 7.50
St. Louis, No. 1	10.00 to 10.50

MACHINE SHOP TURNINGS

Birmingham	8.00 to 9.00
Boston	6.00 to 6.50
Buffalo	8.00 to 9.00
Chicago	7.50 to 8.00
Cincinnati, deal.	8.75 to 9.25
Cleveland	9.00 to 9.50
Detroit	8.00 to 8.50
Eastern Pa.	11.50
New York, deal.	7.00 to 8.00
Pittsburgh	11.25 to 11.75
St. Louis	7.00 to 7.50

MIXED BORINGS, TURNINGS
For blast furnace use

Boston, dealers	6.50 to 7.00
Buffalo	10.50 to 11.00
Cincinnati, deal.	9.00 to 9.50
Cleveland	10.25 to 10.50
Detroit	8.50 to 9.00
Eastern Pa.	10.00 to 10.50
New York, deal.	7.00 to 7.50
Pittsburgh	12.00 to 12.50

CAST IRON BORINGS

Birmingham, chem.	13.00 to 13.50
Birmingham, plain	8.00 to 9.00
Boston, chem	9.50 to 10.00
Boston, dealers	6.00 to 6.50
Buffalo	10.50 to 11.00
Chicago	10.25 to 10.75
Cincinnati, deal.	9.25 to 9.75
Cleveland	10.25 to 10.50
Detroit	8.50 to 9.00
Eastern Pa.	11.00 to 11.50
Eastern Pa., chem.	14.50 to 15.00
New York, deal.	7.25 to 7.50
Pittsburgh	12.00 to 12.50
St. Louis	9.50 to 10.00
Valleys	12.50 to 13.00

PIPE AND FLUES

Chicago, net	8.50 to 9.00
Cincinnati, deal.	8.25 to 8.75

RAILROAD GRATE BARS

Buffalo	13.00 to 13.50
Chicago, net	12.25 to 12.75
Cincinnati	9.50 to 10.00
Eastern Pa.	12.50 to 13.00
New York, deal.	9.25 to 9.75
St. Louis	11.00 to 11.50

FORGE FLASHINGS

Boston, dealers	8.50 to 9.00
Buffalo	12.00 to 12.50
Chicago	9.00 to 9.50
Cleve., over 10 in.	12.25 to 12.75
Detroit	10.00 to 10.50
Pittsburgh	13.50 to 14.00

FORGE SCRAP

Boston, dealers	6.00 to 6.50
Chicago	16.50 to 17.00
Eastern Pa.	11.50 to 12.50

ARCH BARS AND TRANSOMS

Chicago, net	20.50 to 21.00
St. Louis	18.25 to 18.75

Iron, Steel Works Scrap

AXLE TURNINGS

Boston, deal	6.75 to 7.00
Buffalo	12.00 to 12.50
Chicago	11.00 to 11.50
Cleveland	12.50 to 13.00
Eastern Pa.	12.00 to 13.00
Pittsburgh	15.00 to 15.50
St. Louis	9.50 to 10.00

STEEL CAR AXLES

Birmingham	16.00 to 17.00
Boston, ship point	16.00 to 16.50
Buffalo	17.75 to 18.25
Chicago	18.50 to 18.75
Cleveland	16.00 to 16.50
Eastern Pa.	20.00 to 21.00
Pittsburgh	18.50 to 19.50
St. Louis	18.00 to 18.50

SHAFTING

Boston, ship point	14.00 to 14.50
Chicago	17.35 to 17.90
Eastern Pa.	20.00 to 21.00
New York, deal.	15.00 to 16.00
St. Louis	17.00 to 17.50

Iron Foundry Scrap

CAR WHEELS

Birmingham, iron	12.00 to 12.50
Boston, con.	14.00 to 14.50
Buffalo, iron	13.00 to 13.50
Buffalo, steel	16.00 to 16.50
Chicago, iron	13.00 to 13.50
Chi., rolled steel	17.00 to 17.50
Cincinnati	12.00 to 12.50
Eastern Pa., cast	16.50 to 17.00
Eastern Pa. rolled	17.00 to 17.50
N. Y., iron, deal.	12.50 to 13.00
Pittsburgh, iron	15.50 to 16.00
Pittsburgh, steel	18.50 to 19.50
St. Louis, iron	13.00 to 13.50
St. Louis steel	15.50 to 16.00

No. 1 CAST SCRAP

Birmingham, cup.	14.00 to 14.50
Buffalo	15.50 to 16.00
Boston, textile	15.50 to 16.00
Buffalo	14.25 to 14.75
Chicago, mach.	16.50 to 17.10
Chicago, railroad	15.95 to 16.50
Chicago, agri.	14.30 to 14.85
Cincinnati, mach. cupalos, net deal.	16.00 to 16.50
Cleveland, cupola	16.00 to 16.50
Detroit, net	12.25 to 12.75
Eastern Pa. cupola	17.00 to 17.50
N. Y., cup., deal.	13.00 to 13.50
Pittsburgh, cupola	14.50 to 15.00
San Fran., del.	13.50 to 14.00
Seattle	15.50 to 15.75
St. Louis	13.00 to 13.50
Valleys	16.50 to 17.00

HEAVY CAST

Boston	10.50 to 11.00
Buffalo, breakable	12.50 to 13.00
Cleve., breakable	12.25 to 12.75
Detroit, auto., net	18.00 to 19.00
Eastern Pa.	16.50 to 17.00
New York, deal.	12.50 to 13.00
Pittsburgh	13.00 to 13.50

MALLEABLE

Boston, railroad	13.50 to 14.50
Buffalo	15.50 to 16.00
Chicago, agri.	15.00 to 15.50
Chicago, railroad	15.00 to 15.50
Cinn., R. R., deal.	14.00 to 14.50
Cinn., agri., deal.	13.00 to 13.50
Cleveland, agri.	15.00 to 15.50
Cleveland, rail.	15.00 to 16.00
Detroit, auto	14.50 to 15.00
Pittsburgh, rail.	14.00 to 14.25
St. Louis, rail	14.00 to 14.50

Miscellaneous Scrap

RAILS FOR ROLLING
5 feet and over

Birmingham	10.50 to 11.00
Boston, dealers	10.50 to 11.00
Buffalo	14.75 to 15.25
Chicago	16.25 to 16.75
Eastern Pa.	14.50 to 15.00
New York	11.50 to 12.00
Pittsburgh district	16.50 to 17.00
St. Louis	14.75 to 15.25

LOCOMOTIVE TIRES

Chicago, No. 1	14.00 to 14.50
Chicago, cut	16.00 to 16.50
St. Louis, No. 1	12.25 to 12.75

LOW PHOS. PUNCHINGS

Chicago	15.50 to 16.00
Pittsburgh	17.00 to 17.50

to $9.50, New York. Other grades advanced are rails for rolling, stove plate for mill consumption, mixed borings and turnings and clean cast borings.

Boston, Oct. 9.—All classes of scrap have been active during the past week. Pittsburgh and Eastern Pennsylvania mills have been taking good volume and the expectation of another boat loading for Danzig late in the month has resulted in some buying. Prices rule firm to strong, with advances showing in several lines.

Philadelphia, Oct. 9.—Scattered buying features the iron and steel scrap market. Current prices are well maintained, the only change being an advance of 50 cents on cupola cast, which foundries have bought at $17 to $17.50, delivered.

Buffalo, Oct. 9.—Scrap prices are soaring, with many dealers reported short and facing heavy losses in deliveries on contracts. A sale of No. 1 heavy melting steel at $16.50 is reported here with predictions of the next movement at $17. Brisk demand has developed for most grades.

Pittsburgh, Oct. 9.—A stronger tone has been lent to the iron and steel scrap market by higher prices paid for material on the October list of the Pennsylvania railroad. Heavy melting steel brought around $17.75, with $18.65 to $18.75 paid for steel specialties and $17.25 for rails. Mill buying has been light following recent heavy transactions on the part of the United States Steel Corp. but dealers have been active in covering on old orders.

Cleveland, Oct. 9.—Activity in scrap still revolves about dealers covering shorts. These, however, now are down to a point almost normal for this season. Local mills are comfortably situated as regards scrap for three months at least and one interest claims to be supplied until spring. Market strength is retained by various grades, and one or two are up 25 cents, including heavy melting steel at $13.75 to $14.25 and large forge flashings at $12.25 to $12.75. Steel scrap in the valley reflects strength in the Pittsburgh district. Youngstown prices on heavy melting steel and compressed sheets have been advanced 50 cents to $15.50 to $16. Absorption of losses here are lower than in Pittsburgh territory where it is claimed as much as $3 per ton loss has been accepted by dealers in paying $17 to cover $14 orders. Steel on the Pennsylvania railroad list is reported to have brought $17.60 to $17.90, Wellsville, and other Ohio points.

Cincinnati, Oct. 9.—The scrap market has turned sharply upward with advances in dealers' buying prices of 25 cents to $1 a ton. Nearly the entire list has been stimulated by activities of dealers endeavoring to buy. Of steel plant grades of scrap there is a shortage.

St. Louis, Oct. 9.—General scarcity of scrap, acute on certain grades, continues. Railroad offerings have fallen to small proportions, and little tonnage is moving from the country. As a result prices are strong with additional advances on certain grades, mainly in steel. Consumers need supplies and are requesting quick shipments on material under contract. They would purchase heavily, but are not willing to meet quotations put out by dealers.

Birmingham, Ala., Oct. 9.—Iron and steel scrap is again somewhat improved though the market is not active. Heavy melting steel, stove plate and No. 1 cast are moving.

Toronto, Ont., Oct. 9.—No advance buying is reported in the iron and steel scrap market, but demand on spot account is brisk. Toronto and Montreal dealers report improvement in sales with number and tonnages well above those of a month or six weeks ago. The only change in prices is in heavy melting steel for which Toronto dealers are now offering $9.50 per gross ton delivered Toronto. Other lines are firm but unchanged.

Canadian Scrap

Dealers' Buying Prices

MONTREAL

Per Gross Ton

Iron axles	$22.00
Steel axles	20.00
Car wheels	16.00
Stove plate	13.00
Wrought pipe	5.00
Turnings	6.00
Heavy melting steel	7.50

TORONTO

Steel axles	14.00
Iron axles	16.00
Heavy melting steel	9.50
Turnings	7.00
No. 1 mach. cast (net)	15.00
Malleable, (net)	13.00
Stove plate (net)	9.00

To Arbitrate on Scrap

New York, Oct. 9.—The arbitration commission of the Institute of Scrap Iron and Steel, 11 West Forty-second street, has drawn up a set of rules and regulations for arbitration of disputes within the industry, which will be submitted for final ratification at an early meeting of the executive committee.

Benjamin Schwartz, director general, is now on a trip, during which he will outline the work of the institute at a series of meetings in various eastern cities.

Semifinished

Market Is Active, with Operations Near Capacity—Prices Steady—Wire Rods in Demand

DEMAND for semifinished steel continues at a high rate, some mills operating at 100 per cent and falling behind in deliveries. Makers generally quote $34, base, Pittsburgh, on billets and slabs, although some sales have been made for fourth quarter at $33. Sheet bars are $33, Pittsburgh. Valley mills are doing $33 on sheet bars, billets and slabs.

SEMIFINISHED STEEL PRICES, PAGE 934

Cleveland, Oct. 9.—Intermittent activity continues in semifinished steel. The Otis Steel Co., which recently inquired for 3000 tons of ingots, with 3500 tons of slabs and low carbon sheet bars, placed the former with a valley mill at $28, Youngstown, and a portion of the latter tonnage with the same producer at $33, the low carbon sheet bars carrying an extra of $1 per ton, making the price $34, Youngstown. Wire rods are selling at $42. Large buyers taking 1000 to 1500 tons at a time have endeavored to break that price but have been unsuccessful. Some orders for stirring rods, 1½-inch square, 28 to 30 feet long were sold in lots of 100 tons at $39, Youngstown. The leading local merchant producer of semifinished steel is operating all of its 14 open hearths.

Pittsburgh, Oct. 9.—Mills generally are quoting $34 on 4 x 4-inch rerolling billets and slabs, although some fourth quarter tonnage has been booked at $33. Sheet bars are steady at $33, with wire rods holding at $42. Forging billets command $38. Demand is fairly active but some mills have little material to sell because of continued high operations in their finishing departments.

Youngstown, O., Oct. 9.—The bulk of the sales of semifinished material now being made by local mills is composed of sheet bars and wire rods, with a mere sprinkling of small billets and a few slabs. Sheet bars bring $33, Youngstown and Pittsburgh, while billets and slabs are quoted at $34, and wire rods at $42, Cleveland and Pittsburgh. The movement of wire rods appears to be picking up somewhat in volume.

Find Chronite in Ontario

Toronto, Ont., Oct. 9.—Discovery of a large body of chromite south of Collins, a station on the transcontinental line of the Canadian National railway west of Armstrong, Ont., is creating much interest. There is said to be a dyke 700 feet wide and a mile and a quarter long. Surface samples of the ore have given assay values of 48.91 per cent. The whole dyke has already been staked out.

Bars

Mill Deliveries Further Deferred by Chicago Mills—Heavy Volume of Buying Continues

CHICAGO mills find the past week the heaviest of the year in sales and deliveries are being pushed further into the background, three to six weeks being required in some sections. Lack of stocks in hands of consumers makes prompt delivery necessary. Most users now covered for fourth quarter needs. Special bars also are active.

BAR PRICES, PAGE 933

Chicago, Oct. 9.—Sales tabulations for the seven-day period just closed indicate that sales of bars and other finished products were the heaviest for any week this year. The previous record period, the last week in March, had a slightly higher sales total, but included in that tonnage were heavy rail bookings, which the latest figures do not carry. Sales, specifications and shipments in finished steel during the nine months of this year are estimated to be 20 per cent ahead of 1927. Order books have grown much heavier in the past ten days, indicating further strides in fourth quarter contracting. Heavy shipments and capacity operations feature activity in Chicago district bar mills. Deliveries for some sections of bars have been extended three to six weeks. Buying is widely scattered among all miscellaneous metalworking lines. Although several farm implement interests and tractor builders have enlarged capacities in recent months, their production is at practical capacity. Implement and automotive demands call for the bulk of the heavy shipments of bars. Specifications during the week were well above the average weekly rate of this year. Shipments keep pace with the rate of specifications.

The increased interest in quarter contracting indicates further sales tonnage placed at 2.10c, Chicago, as numerous smaller miscellaneous buyers are in the market. It is understood the preferential bar price gap has been narrowed to the railroads.

One producer of bar iron has announced the fourth quarter price of 2.10c, Chicago. Farm implement lines are taking more bar iron tonnage than the railroads. Alloy bar mills are operating at about 80 per cent.

Philadelphia, Oct. 9.—Steel bar bookings so far in October are considerably below September, which is in line with expectations. In two or three cases this past week, 1.90c, Pittsburgh, was done on new tonnage but this is exceptional and 1.95c, Pittsburgh, is the usual figure with 2.00c reserved to smaller lots.

Buffalo, Oct. 9.—Some bar business is reported to have been taken for this quarter at 2.05c, Lackawanna, although the prevailing quotation is 2.10c. Specifications are good and steelworks operations in the district generally are holding around 85 per cent.

Pittsburgh, Oct. 9.—No slackening is noted in specifications for merchant steel bars, and some interests report that the opposite is true. The heavy business in some instances is surprising to sellers but substantiates their belief that little or no stocking was done during the latter part of the third quarter. No decline is noted in buying by automotive interests except in cases where new models necessitate some slackening. Contracting for fourth quarter is practically complete with the bulk of users paying 1.95c or 2.00c. Mills are taking a firmer stand in the matter of prices and are refusing new spot business at any price less than 2.00c they say.

Cleveland, Oct. 9.—Merchant bar orders are increasingly numerous for various purposes, largely automotive. Attractive specifications are accruing to the mills outside the district who contracted with their customers on the basis of 1.95c, Cleveland, or 1.90c, Pittsburgh. Some contracts carry a 1.95c, Pittsburgh, figure. Local mills are quoting 1.90c, mill. Bar mills generally are operated at 85 per cent of capacity or more. Deliveries are becoming more deferred, three to five weeks' datings becoming more common. Some spot buyers have become so anxious for tonnage they no longer quibble over prices. Attractive screw stock orders are numerous.

Imports Are Heavy

Philadelphia, Oct. 9.—Heavy steel imports were received at this port during the week ending Oct. 6. They included 1010 tons of iron skelp from France; 369 tons of structural shapes from Belgium; 112 tons of structural shapes from France; 242 tons of steel billets from France; 27 tons of steel billets from Sweden; 31 tons of steel bars from Sweden; 12 tons of steel bars from Belgium; 26 tons of steel sheets from Germany; 15 tons of strip steel from the United Kingdom and 12 tons of strip steel from France.

Plates

Oil Tank, Car and Railroad Work Showing More Activity—Specifications Heavy

MISCELLANEOUS plate demand continues heavy, with fourth quarter contracts increasing in number and size. Inquiries from car builders and for railroad bridge work are more numerous. Specifications at Chicago during the past week exceeded the weekly average for the year. A large volume of oil tank work for Pacific coast fields is bringing new business into the market.

PLATE PRICES, PAGE 933

Pittsburgh, Oct. 9.—Demand for plates has shown little slackening so far this month. Buying is fairly well distributed for a variety of uses, with oil tank work supplying a fair share of current demand. Fourth quarter contracts have been signed by the greater portion of consumers, with most users paying 1.95c or 2.00c. Mills are quoting 2.00c on any new business.

New York, Oct. 9.—For the first time in more than two years eastern plate mills are running behind in their deliveries of sheared plates. These mills also are in the same position with reference to universal plates that they encountered last spring, when they ran behind in their shipments. In some cases the mills now are scheduled three weeks ahead, and consumers are being advised to get in their specifications without delay in order to be assured of a place in the rollings. Along with the extension of deliveries comes an increase in the demand. Bookings of the past week in this territory have been heavy. A feature is the firmness of prices, 2.05c, base, Coatesville, now being the absolute minimum, while 2.10c is the usual price. On some of the small tonnages 2.15c, base, Coatesville is being obtained. About 1500 tons of plates are involved in an inquiry for 15 barges for the New York Central railroad. About 800 tons of plates are involved in an inquiry for 20 locomotives for the Lackawanna railroad. Good inquiries for plates have been circulated by some of the oil companies, particularly the Standard Oil Co. of New Jersey.

Philadelphia, Oct. 9.—Plate demand continues active, with mills cautious about making promises of shipment, owing to the sold-up condition. Plate prices are the firmest they have been in a long time, the range in this district being 2.05c to 2.10c, base, Coatesville, equivalent to 2.15c to 2.20c, delivered, Philadelphia, while on

many small lots 2.15c, Coatesville, is being done.

Cleveland, Oct. 9.—Platemakers in general have not fared as well as have the bar and structural shape producers. One or two, however, report that the volume of incoming business doubles the September rate. This situation belies the theory that specifications toward the end of the third quarter were speculative. Demand is well scattered among different consuming lines. Many small orders are placed by boiler shops and portable tankmakers, comprising a single carload or 50 to 75 tons at a time. Some fabricators are asking for protections on 300 to 500 tons at a time. Several recent orders for universal plates involved 150 or 200 tons. Most of these, possibly 95 to 98 per cent carry a 1.95c, Pittsburgh, price.

Chicago, Oct. 9.—Inquiries for railroad car equipment and railroad bridge work give promise of increased backlogs for the heavy plate mills. Specifications during the week were well over the weekly average for this year. Fourth quarter contracting is growing in volume from miscellaneous manufactures, considerable of the business being placed at 2.10c, Chicago. No new inquiries have come out for tank plates, but reports from the Pacific coast oil fields state that a large volume of miscellaneous tank plate inquiry is in the making.

CONTRACTS PLACED

1600 tons, four 134,000 barrel tanks, General Petroleum Corp., Los Angeles; to Western Pipe & Steel Co.

100 tons, buildings at the Agricultural and Mechanical college, Alport, Miss.; to Laclede Steel Co.

Unstated tonnage, 10 steamers of Welland Canal size, for the Paterson Steamship Ltd., Fort William, Ont; to British builders.

CONTRACTS PENDING

1300 tons, 15 barges, New York Central railroad; bids being taken.

231 tons, 24-inch pipe line, Seattle. Bids Oct. 26.

Scrap Rates Too High

Washington, Oct. 9.—Rates on iron and steel scrap, in carloads, from Newport News, Va., to certain destinations in Maryland, Delaware, New Jersey and eastern Pennsylvania have been found unreasonable in a proposed report of T. Leo Haden, an examiner of the interstate commerce commission, in the case of the Newport News Shipbuilding & Dry Dock Co. against the Baltimore & Ohio railroad. Reasonable rates were prescribed for the future.

In the same proposed report it was found that rates on scrap iron, in carloads, from Newport News, Norfolk, Portsmouth and Richmond, Va., to Baltimore were also unreasonable and reasonable rates were prescribed for the future and reparation awarded.

Pipe

Shipments High at Chicago—2120 Tons Awarded in West—New Mexican Line to be Let

PRESSURE pipe shipments in Chicago territory reach the highest rate of the year. That city bought 2120 tons cast pipe. Centrifugal pipe operations in south are 100 per cent plus. At Boston 6 to 12-inch pipe declines $1. Lowell opened bids on 100 tons and Pittsfield awarded 600 tons. An Ohio interest will purchase 6 to 14-inch line pipe for installation in New Mexico.

PIPE PRICES, PAGE 934

Pittsburgh, Oct. 9.—Demand for merchant steel pipe continues satisfactory. Prospects are that the remainder of the year will show improvement over the corresponding 1927 period. Buying of tubular products for oil country use continues at the improved rate of the last four or five weeks. A slight tendency is noted for jobbers to carry larger stocks and some users are anticipating their future requirements to a greater extent.

Boston, Oct. 9.—A reduction of $1 a ton in 6 to 12-inch cast iron pipe took effect last week. Sizes under that hold firm. This places 6 to 12-inch pipe at $40.10 to $41.10, while 4-inch pipe remains unchanged at $45.10 to $46.10 common Boston freight rate points. The state has awarded 316 tons of 6, 8 and 10-inch pipe for the Waltham hospital to R. D. Wood & Co. Lowell has opened bids for 100 tons 6 and 8-inch pipe. Pittsfield's new water system will require 600 tons of 48-inch pipe.

New York, Oct. 9.—Dullness continues to characterize the cast pipe market with little developing in the way of either private or municipal demand. A slightly improved inquiry is coming out of New England but the scope of this demand is relatively small. Prices are unchanged.

Cleveland, Oct. 9.—While one merchant pipe producer reports the receipt of several carload orders every few days from its large list of jobbers in northern Ohio, others report only a desultory demand. Building activity is somewhat less than a year ago and the turnover is lower. Within a week an Ohio interest may purchase a large quantity of 6 to 14-inch line pipe for a Farmington, New Mexico project. Possibly 100 to 150 miles are involved.

Chicago, Oct. 9.—Cast iron pressure pipemakers report shipments at the highest rate of the year. Municipal inquiry is negligible but contractors are making the most of the next 30 days to complete pending subdivision work before cold weather. Consequently, small-lot orders are in good volume. The price of larger sizes has stiffened slightly in recent carload orders, but the range of $34 to $35, base, Birmingham, still is quoted.

Birmingham, Ala., Oct. 9.—A few lettings still are being received by cast iron pressure pipe shops. Production continues steady. Quotations are firm at $34 to $35 on 6-inch and over with no concessions heard of, even on offers of large tonnage. Several plants operating mechanically made pipe departments, such as centrifugal pipe, on full time with some overtime. Little stock is seen on yards. Transportation service enables producers to meet requests for early delivery.

CONTRACTS PLACED

2120 tons, 6, 8, and 12-inch pipe for Chicago, to Glamorgan Pipe & Foundry Co.

316 tons, 6, 8 and 10-inch cast pipe, State of Massachusetts for hospital at Waltham, Mass.; to R. D. Wood & Co.

282 tons, 6 to 12-inch class B and C, Sixth avenue, northwest, Seattle. General contract to S. A. Moveri.

142 tons, 4 to 14-inch class B, Oxnard, Calif., to United States Cast Iron Pipe & Foundry Co.

CONTRACTS PENDING

600 tons, 48-inch cast pipe, new water system for Pittsfield, Mass.; contract awarded William B. Brown & Co., but formal order not yet placed.

586 tons, 6 to 12-inch class B cast pipe and 2000 feet 2-inch wrought pipe for Amagansett, Long Island; general contract to W. G. Fritz Co., West Orange, N. J.

250 tons, fittings for Chicago waterworks department; bids Oct. 11.

200 tons, 12-inch cast pipe for department of water supply, gas and electricity, New York, for installation in Brooklyn. Riverside Water Works is low on general contract.

100 tons, 6 and 8-inch cast pipe for Lowell, Mass. Bids opened Oct. 4.

Four to five miles, 6 and 8-inch cast pipe, Riverhead Water district, Long Island; general contract to W. G. Fritz Co., West Orange, N. J.

Iron Ore

Shipments Continue Heavy—Lake Erie Dock Balance Below 1927 Figure

IRON ORE PRICES, PAGE 934

Cleveland, Oct. 9.—Shipments of Lake Superior iron ore continue on the heavier schedules inaugurated several weeks ago as the result of the increase in iron and steel demand. New orders are comprised mainly of small fill-in tonnages. The Lake Superior Iron Ore association reports the fol-

lowing receipts at Lake Erie ports, and shipments to interior furnaces for the season to Oct. 1:

Port	Receipts	Shipments	Dock balance Oct. 1, 1928
Buffalo			
No. Tonawanda			
Port Colborne	3,177,912	13,691	2,496
Erie	368,174	379,102	60,365
Conneaut	6,475,539	6,104,232	1,892,469
Ashtabula	4,661,000	4,522,307	2,088,642
Fairport	1,398,894	1,350,318	385,263
Cleveland	6,766,231	4,371,866	1,106,250
Lorain	2,563,766	1,288,580	118,439
Huron	825,162	843,880	390,138
Toledo	1,104,832	606,062	56,394
Total	27,341,510	19,480,038	6,100,456
Comparative total 1 Yr. previous	29,792,366	21,556,077	6,768,735

Sheets

Heavy Volume of New Business Develops at the Higher Figures —Shipments Well Sustained

NEW business in sheets is exceeding expectations. Shipments continue heavy, to a wide variety of consumers. Backlogs are growing and deliveries are being extended. Prices are firm. More tonnage was placed in the eastern district at the new prices in the first week of October than at the old figures in the last week of September.

SHEET PRICES, PAGE 923

Pittsburgh, Oct. 9.—Sheet business received by mills in this district is surprisingly large. Automotive companies continue to forward orders in heavy volume although other consuming lines such as the barrel, refrigerator, electrical manufacturing, stove and radio industries are active in ordering. New models by several automobile builders are expected to provide substantial tonnages in the near future. Mills report no shading of the 2.75c, base, Pittsburgh, price on sheet mill black, while tin mill black continues firm at 2.90c, galvanized at 3.50c, blue annealed at 2.00c, with 4.00c prevailing on full finished material. Present backlogs of mills have extended deliveries so that three to four weeks is the best shipment promised for blue annealed material, while shipments on other grades are still further deferred. Operations are steady, with the American Sheet & Tin Plate Co. continuing to run practically full.

New York, Oct. 9.—Demand is far exceeding expectations in the sheet market here. All makers of sheets enjoyed a good volume of bookings during the past week. The surprising feature is that some mills booked more business here at the new prices last week than they booked the week previous at the old prices. The only explanation seems to be that some of the buyers had expected to continue buying at the old prices, but have found that they cannot do so. All indications are that the market is firm at 2.00c, base, Pittsburgh, for blue annealed sheets, 2.75c for black sheets and 3.50c for galvanized.

Buffalo, Oct. 9.—Sheet production in local steelworks is holding at or above 90 per cent of capacity. Prices are firm and the smaller cash discount is being rigidly enforced.

Youngstown, O., Oct. 9.—Extraordinary pressure for deliveries on some grades of steel sheets is driving mills in this district to high rates of operation, higher than in many months. Sheet mill operations are around 88 per cent, practically unchanged from the last three weeks. The anxiety of consumers of sheets now appears to gain place on mill books which will insure deliveries within a month. Some mills are booked for six weeks and others for two full months. Only specifications are being considered these days, because operating schedules are based on them. One important maker here reports his shipments in September were two and one-half times the tonnage shipped by him in September last year. Other mills have done almost as well. No other quotations are heard in this valley than these: Black sheets 2.75c, Pittsburgh; blue annealed 2.00c to 2.10c; autobody 4.00c and galvanized 3.60c.

Cleveland, Oct. 9.—While a year ago at this time sheet producers had open tonnage, now they have good backlogs and deliveries are increasingly deferred. Deep drawing stock cannot be had before the week of Nov. 24 and some other high finished sheet makers have started to name December datings. Even on ordinary finishes 3 to 5 weeks are needed. Some purchasers of standard sizes find they have to wait. A few makers continue to offer concessions. On an inquiry for 1100 tons of blue annealed a West Virginia maker quoted considerably under 2.00c. On a 600-ton lot of black, single pickled, a maker who quoted 2.70c may lose the order to a mill adhering to the market price of 2.75c, because of previous service rendered.

Chicago, Oct. 9.—Sheet mills in the Chicago district are shipping material at a heavy rate. Even with the higher rate of shipments deliveries are lengthening and now run three to six weeks in some gages and grades. Blue annealed are leading in activity, but the volume of black and galvanized sales has made a substantial gain in the past three weeks. Mills are quoting Chicago delivered prices at 2.90c for No. 24 black; 3.65c for No. 24 galvanized, and 2.15c for No. 10 blue annealed, mill prices for outside shipment being $1 a ton below this.

St. Louis, Oct. 9.—Sheet specifications during the last two weeks of September were unusually large, and made that month the largest September on record. Considerable reaction against the lowered discount is reported, particularly among jobbers. The new fourth quarter prices, however, are being accepted with relatively little complaint.

Philadelphia, Oct. 9.—The sheet market is featured by good current demand, although tonnage now is not so large as in September. New prices are being firmly maintained at 2.00c, base, Pittsburgh, for blue annealed, plus $2 a ton on widths over 45 inches, while on small lots 2.10c, base, is being done in numerous instances. Black sheets are firm at 2.75c, and galvanized at 3.50c.

Bolts, Nuts, Rivets

Specifications Continue at September Rate—Prices Steady

NUT AND BOLT PRICES, PAGE 934

Pittsburgh, Oct. 9.—Specifications for bolts, nuts and rivets continue hand-to-mouth and show little change from the September rate. Bolts and nuts continue at 60 to 70 off, with 2.90c, Pittsburgh, prevailing on large rivets. Operations hold at 60 to 65 per cent of capacity.

Cleveland, Oct. 9.—Small orders are straggling through every few days to the nut, bolt and rivet manufacturers. Some customers buy a few thousand bolts at a time at regular intervals. Locomotive shops are ordering more rivets. Fabricating and boiler shops too are more active in specifying for rivets on fourth quarter contracts at 2.90c. Small rivets are firm at 70 and 10 off. Nuts and bolts are quoted at 70 off.

Chicago, Oct. 9.—Specifications for bolts, nuts and rivets are growing in volume. Demand from implement works is well sustained. Operations have gained a few points and now are slightly above 75 per cent. Spot business in bolts and nuts is being closed at 60 to 70 off. Structural rivets in carload lots are steady at 3.00c, Chicago.

Tin Plate

Specifications Fairly Active — Mills Operating at 80 Per Cent

TIN PLATE PRICES, PAGE 933

Pittsburgh, Oct. 9.—Tin plate operations in this district have declined in recent days, although no more than normally for this time of the year. Mills are running about 80 per cent of capacity. Specifications from most consumers still are fairly active, although canmakers have practically completed their buying for material for this season's pack.

From 1907 to 1927 production of fuel briquets in the United States increased fifteenfold.

Structural Shapes

Mills in West Operate Better—Fourth Quarter Prices Higher—Many Jobs Closed in Pittsburgh and New York

WESTERN structural mills, improving their operating position by 5 points, now average 80 per cent. The gap between the so-called preferential and regular buyer is narrower as fourth quarter levels are applied. Bridge work is a feature in the west where three awards total 4900 tons. Pending bridge work there is said to involve about 45,000 tons. Pittsburgh district fabricators are well booked, seven projects recently let there, take 2700 tons, the largest individual job requiring 905 tons. A city hall at Buffalo involves 8000 tons and subway work at New York will take 6700 tons. In excess of 15,000 tons were let in New York this past week in connection with 10 or more projects, mostly buildings, with some bridge work. All awards total 39,523 tons.

STRUCTURAL SHAPE PRICES, PAGE 933

New York, Oct. 9.—After several weeks of substantial business, structural demand continues heavy. Inquiry is featured by 6700 tons for an additional subway section. This brings the total of this work now actively pending to 22,000 tons. Awards are featured by the placing of ten or more contracts totaling in excess of 15,000 tons. Prices generally are strong.

While September was a good month structural shapes, buying for purely building construction was only moderate. The New York Structural Steel Board of Trade reports 39,067 tons placed exclusive of bridges, subway work, etc., against 44,343 tons for August and 71,000 for July which was the leading month.

Boston, Oct. 9.—Structural shape awards and inquiries developed but little change. The State of Maine has placed a contract for 400 tons for a highway bridge with the American Bridge Co. A state highway bridge at East Hampton, Mass. will take 175 tons. Prices continue firm.

Philadelphia, Oct. 9.—Shape bookings have been exceptionally good this past week. Eastern mills are able to maintain operations at 75 to 80 per cent. Prices are firmest in shapes here current levels being 2.05c to 2.10c, base, eastern mills equivalent to 2.11c to 2.16c, delivered Philadelphia. Few consumers are obtaining steel at lower prices.

Pittsburgh, Oct. 9.—Specifications for plain structural material are steady and in keeping with recent activity in building and engineering construction. Awards have been few and involve small lots. Inquiry also has been quiet but this condition is regarded as temporary. Most fabricators are well booked. Fourth quarter contracting for plain shapes is nearly complete at 1.90c to 2.00c, with mills generally firm in qpoting the latter figure on new business.

Buffalo, Oct. 9.—It now appears that the Buffalo municipal building, held up for two years by political differences, will be erected early in 1929. Specifications indicate that about 8000 tons of structural steel will be needed. The new Curtiss plant and the 20-story United office building at Niagara Falls, are other projects for which definite tonnages have not been figured but which are large enterprises from the shapemakers standpoint.

Cleveland, Oct. 9.—Shape mills report that observance of the Sept. 30 deadline on third quarter contracts was never before so nearly 100 per cent. Contracting for fourth quarter is well under way and already specifications against these higher priced arrangements are coming through, usually at 1.95c, Pittsburgh. Some larger customers are taken care of at 1.90c. The outstanding award of the week involves 3000 tons for a bridge going to an unidentified fabricator.

Chicago, Oct. 9.—Railroad bridge work and prospects for early car equipment buying feature the structural market. Awards and inquiries in railroad bridges total close to 50,000 tons. Mill order books for plain structural material are much heavier than a year ago. Fourth quarter contracting has taken a marked spurt. Shipments are heavy. Structural mills have gained about five points during the week and are close to 80 per cent for the district. It is understood the gap in price has been narrowed against preferred industries so that the contract prices paid by consumers average higher than in last quarter. Considerable business has been closed at 2.10c, Chicago.

Awards Compared

	Tons
Awards this week	39,523
Awards last week	61,170
Awards two weeks ago	26,800
Awards this week in 1927	28,713
Average weekly awards, Sept.	42,968
Average weekly awards, 1928	40,046
Total awards to date, 1927	1,448,580
Total awards to date, 1928	1,601,849

CONTRACTS PLACED

3400 tons, Y. M. C. A. building, West Sixty-third street, New York; to unnamed fabricator.

3000 tons, bridge, Cleveland; to unnamed interest.

2700 tons, Salvation Army headquarters, New York; to Hedden Iron Construction Co.

2500 tons, bridges for Norfolk & Western, Columbus, O.; to Mt. Vernon Bridge Co.

2200 tons, bridge work for Great Northern railroad; to American Bridge Co.

2000 tons, Sterrick building, Memphis, Tenn.; to Virginia Bridge & Iron Co.

1800 tons, dairy exhibit building, St. Louis, National Exhibition association; to Stupp Bros. Bridge & Iron Co.

1600 tons, Journal square theater, Jersey City; to unnamed fabricator.

1500 tons, building, 1073 Fifth avenue, New York; to Paterson Bridge Co.

1500 tons, bridge at North Platte, Nebr; to Omaha Steel Co.

1300 tons, column cores, Haddon Hall addition, Atlantic City; to Bethlehem Steel Co.

1200 tons, bridge work for Chicago, Burlington & Quincy railroad, in the Chicago district; to American Bridge Co.

1200 tons, Garden Court annex, Philadelphia; to R' B. Lederle.

1180 tons, building at Atlanta, Ga., for Rhodes-Haverty Co., Baltimore; to the Ingalls Iron Works Co. Previously announced as awarded to unnamed interest.

1000 tons, clubhouse Chicago club, 404 South Michigan avenue, Chicago; to A. Bolter & Sons.

1000 tons, miscellaneous bridge work in Wisconsin; to Wisconsin Bridge & Iron Co.

905 tons, Celanese Corp. of America, Cumberland, Md., 730 tons for boiler building and 175 tons for machinery building; to McClintic-Marshall Co.

815 tons, finishing mill, Marquette Cement Co., La Salle, Ill.; to Mississippi Valley Structural Steel Co.

800 tons, building Micarta plant, Trafford City, Pa., Westinghouse Electric & Mfg. Co.; to Jones & Laughlin Steel Corp.

650 tons, office building, Tucson, Ariz.; to McClintic-Marshall Co.

550 tons, Circle theater, Frankford, Philadelphia; to Bethlehem Fabricators Inc.

500 tons, building for Pennsylvania railroad in Philadelphia; to McClintic-Marshall Co.

500 tons, highway bridge, Howland, Me.; to American Bridge Co.

500 tons, pier, Wildwood, N. J.; to Philadelphia fabricator.

500 tons, Hildebrecht building, Trenton, N. J.; to Bethlehem Construction Co.

500 tons, Camden Safe Deposit and Trust building, Camden, N. J.; to Bethlehem Fabricators Inc.

500 tons, bridge, Chicago & Northwestern railroad, Appleton, Wis.; to Wisconsin Bridge & Iron Co.

450 tons, bridge, Sixth and Allegheny streets, Philadelphia; to Phoenix Bridge Co.

400 tons, Dupont plant addition in West Virginia; to American Bridge Co.

350 tons, warehouse No. 45, W. S. Tyler Co., Cleveland; to National Iron & Wire Co.

300 tons, reduction plant, Woodward Iron Co., ore mines; to Virginia Bridge & Iron Co.

300 tons, mill building, Columbia Malleable Steel Castings Co., Columbia, Pa.; to McClintic-Marshall Co.

275 tons, office building, Fourth and Pine streets, Long Beach, Calif.; to Llewellyn Iron Works.

260 tons, highway bridge, Lawtons, N. Y.; to American Bridge Co.

250 tons, Erie railroad bridge, Youngstown, O.; to American Bridge Co.

250 tons, building, John A. Roebling's Sons Co.,

Trenton, N. J.; to McClintic-Marshall Co.
218 tons, bridge, Pennsylvania railroad, Woodbury, N. J.; to Phoenix Bridge Co.
200 tons, Southwestern National bank, Philadelphia; to S. G. Mathews & Co.
200 tons, office building, South Broadway, Los Angeles; to Llewellyn Iron Works.
200 tons, annealing building extension, Youngstown Sheet & Tube Co., Youngstown; to McClintic-Marshall Co.
200 tons, Long Island railroad bridge, Bay Ridge section, Brooklyn; to unnamed fabricator.
200 tons, Church of the Resurrection, Philadelphia; to McClintic-Marshall Co.
175 tons, highway bridge Rapps Mill, Pa.; to American Bridge Co.
150 tons, high school, Montgomery, Ala.; to Virginia Bridge & Iron Co.
150 tons, coal trestle, Hicks Coal Co., Tarentum, Pa.; to Guibert Steel Co.
130 tons, office building, Glendale, Calif.; to Llewellyn Iron Works.
130 tons, Byron Jackson Pump Co. plant addition, Los Angeles; to McClintic-Marshall Co.
115 tons, building, Precision Die Casting Co., Cleveland; to Forest City Structural Steel Co.

CONTRACTS PENDING

8000 tons, city hall, Buffalo. John J. Wade, Buffalo, architect, now drawing specifications. Bids about Jan. 1.
6700 tons, subway, section 4, route 106, Bronx, New York, bids to be opened by transit commission Oct. 16.
6000 tons, Lefcourt building, Forty-first street and Madison avenue, New York; preliminary estimate.
5000 tons, St. George hotel addition, Brooklyn.
3500 tons, theater and hotel building, Cincinnati, 40 stories high; plans being prepared.
1200 tons, court house, Camden, N. J.
1000 tons, apartment school, Lane and Washahickon streets, Philadelphia.
800 tons, Brearly school, Eighty-third street and East River, New York, Turner Construction Co., general contractor.
700 tons, public school, Newark, N. J. Bids in.
500 tons, Pennsylvania hospital building, Philadelphia; general contract to Turner Construction Co.
500 tons, Wernersville college, Wernersville, Pa.
500 tons, building Eighty-eighth street and fifth avenue, New York.
500 tons, Mystic Shrine temple, Harrisburg, Pa.
470 tons, shapes and plates, locks and gates, Deadman's island dam, Ohio river, near Pittsburgh; Dravo Contracting Co., low bidder.
400 tons, school, Long Beach, Long Island.
300 tons, community center, Hershey, Pa.
300 tons, apartment, Atlantic City, N. J.
300 tons, apartment, Hillcrest street, Los Angeles. Bids being received.
175 tons, state highway bridge, Massachusetts Highway commission, East Hampton, Mass.
150 tons, building for Chevrolet Motor Co., Bloomfield, N. J.
100 tons, parochial school, 182nd street and Belmont avenue, New York.
100 tons, church, Pasadena, Calif. Bids being received.
Unstated tonnage, Richmond Memorial hospital, Staten island.
Unstated tonnage, Samaritan home, 440 East Eighty-eighth street. J. F. Jackson, architect.

Steel Bridges Discussed

American Institute of Steel Construction Inc., New York, has published a 19-page booklet entitled "Endurance and Beauty in Steel Bridges," by Charles Evan Fowler, consulting bridge engineer. The subject matter has been prepared by a bridge specialist and is written in language which will appeal to the layman interested in bridge projects. Mr. Fowler sets forth the lasting qualities of a well-designed steel bridge and the artistic possibilities of steel construction in an interesting nontechnical style.

Germany produces about 80 per cent of the world's tonnage of fuel briquets.

Concrete Bars

Contractors Closing Old Protections—Many Jobs Let in East—New Prices Effective

ACTIVITY in concrete bars is more pronounced as old protections are closed out and new prices become fully operative. At New York 15 or more projects were let taking in excess of 3500 tons. Three jobs at Chicago and two at Cleveland take 400 and 635 tons. Shipments of the leading St. Louis district producer in nine months this year equal all of 1927.

REINFORCING BAR PRICES, PAGE 933

Chicago, Oct. 9.—Larger billet reinforcing bar fabricators have contracted with the mills for their fourth quarter bars. The industry is expecting a fall building program commensurate with a year ago. Most fabricating shops have good October order books. Contractors are rushing pending projects, and reinforcing bar shipments are high. Billet bar quotations dropped as low as 2.15c in a few bids submitted recently on larger projects, but fabricators now are attempting to fix the 2.30c minimum.

September building permits in Chicago totaled 597, costing $19,670,700, compared with 794 permits, costing $27,340,700 in September, 1927, a decrease of 28.05 per cent in cost. The September total included more apartment house projects than in August.

Boston, Oct. 9.—Odd lot tonnages of reinforcing concrete bars aggregating 200 tons were let here last week. The only important pending item involves 175 tons for the Packard Motor building. Local interests anticipate an improved situation in the near future.

New York, Oct. 9.—Active buying continues to feature this concrete reinforcing bar market. Sellers generally have advanced their prices and the present concentration of orders results from buyers closing up old protections. New prices are 2.00c base Pittsburgh on bars in mill lengths and 2.25c base Pittsburgh when cut to specified lengths. The warehouse price on New York stocks continues 2.80c base delivered locally. Considerable work continues pending.

Pittsburgh, Oct. 9.—Specifications received by mills in this district for concrete bars are active. Small-lot jobs predominate. September generally was a good month and October indicates a slight improvement. Current inquiry is restricted to work generally requiring less than 100 tons at a time.

Buffalo, Oct. 9.—The reinforcing bar market is lively for this season of the year. Recent orders include a 290-ton lot for an Auburn prison shop building. Perhaps six others take 50 tons or less apiece. Pending inquiry is limited. Prices are firm with cut lengths being supplied from stocks at 2.51c, Buffalo.

Cleveland, Oct. 9.—One by one the major projects in this section involving the use of concrete bars, are being closed up. The W. S. Tyler Co., addition taking 435 tons was awarded Bourne-Fuller Co., which also received the contract for 200 tons for the Ohio Bell Telephone Co.'s Randolph exchange building. Additional tonnages will be required by the Union Terminals Co., in connection with the electrification of approaches within the city limits. One buyer reports that whereas 1.75c, delivered on the job was its buying figure throughout the third quarter, it now is being asked to pay 2.15c. In a general way, prices are higher, some 2.25c Pittsburgh quotations on cut lengths being current. Mill lengths are held at 2.00c.

St. Louis, Oct. 9.—Producers and distributors of reinforcing concrete bars report continued active demand. September shipments were the largest on record for that particular month, and the initial movement this month indicates no falling off in activity. The chief outlet is through road building and municipal improvements. Shipments of the leading district producer to Oct. 1 were equal to the total recorded in the 12 months of 1927. Prices hold firm, and with the recent upturn in raw material, notably old rails, any change in the near future is more likely to be upward.

Awards Compared

	Tons
Awards this week	10,169
Awards last week	6,515
Awards two weeks ago	6,190
Awards this week in 1927	2,892
Average weekly awards, Sept.	5,145
Average weekly awards, 1928	6,939
Total awards to date, 1927	223,947
Total awards to date, 1928	277,567

CONTRACTS PLACED

2000 tons, Haddon Hall addition, Atlantic City, N. J.; to Jones & Laughlin Steel Corp., through Turner Construction Co.
900 tons, causeway at Jones Beach, N. Y.; 500 tons to Edward T. Edwards through C. H. Earle, and 400 tons to National Bridge Works, through Raymond Concrete Piling Co.
900 tons, office building, Sutter street, San Francisco; to Gunn, Carle & Co.

600 tons, barracks, Governors island, N. Y.; to Igoe Bros., through James McWilliams.
500 tons, warehouse, John Sexton & Co., Chicago; to American System of Reinforcing.
435 tons, addition, W. S. Tyler Co., Cleveland; to Bourne-Fuller Co.
390 tons, Y. M. C. A. building, Wilmington, Del.; to Kalman Steel Co.
339 tons, dam, Albany, N. Y.; to McClintic-Marshall Co.
300 tons, subway section 1, route 106, New York; to McClintic-Marshall Co., through George H. Flinn Corp.
300 tons, subway work in Brooklyn; to Concrete Steel Co., through Carroll Co.
300 tons, Judah store and office building, Michigan avenue and Huron street, Chicago; to Jones & Laughlin Steel Corp.
290 tons, for shop building, Auburn prison, Auburn, N. Y.; to Kalman Steel Co.
225 tons, apartment, Second street, Los Angeles; to unknown interest.
200 tons, subway section 3 route 106, New York; to Concrete Steel Co., through Clementi Contracting Co.
200 tons, addition Randolph exchange building, Ohio Belle Telephone Co., Cleveland; to Bourne-Fuller Co.
200 tons, miscellaneous work, Boston area; to unnamed interests.
160 tons, building, Lee Higginson & Co., 3941 Broad street, New York; to Carroll-McCreery & Co., Inc.
150 tons, subway section 5-B route 109, New York; to McClintic-Marshall Co., through Cornell Contracting Corp.
150 tons, Illinois road work; to Calumet Steel Co.
150 tons, building for Commonwealth Edison Co., Chicago; to Olney J. Dean & Co.
150 tons, building, Ludlow Typograph Co., Chicago; to Concrete Steel Co.
130 tons, building, American Brass Co., Hastings-on-Hudson, N. Y. to Ferro Building Products Co.
128 tons, Essex county girls vocational school, Newark, N. J.; to Tidewater Structural Materials Corp.
125 tons, convention hall, Hotel Plaza, Atlantic City, N. J.; to Kalman Steel Co.
125 tons, Rokeby apartments, Chicago; to Concrete Engineering Co.
117 tons, construction at Mott Haven yard, New York, for New York, New Haven & Hartford railroad; to Concrete Steel Co., through Babor-Comeau & Co.
105 tons, St. Johns law school, Brooklyn; to Carroll McCreery & Co. Inc.
100 tons, warehouse, Third street, San Francisco; to Gunn, Carle & Co.
100 tons, Public school No. 96, Brooklyn; to Tidewater Structural Materials Corp.
100 tons, Rockland county court house, N. Y.; to Fireproof Products Co.
100 tons, Erie railroad bridge, Rutherford, N. J.; to McClintic-Marshall Co.
100 tons, apartment, Chicago; to Olney J. Dean Co.
100 tons, hotel, Highland Park, Ill.; to Concrete Engineering Co.

CONTRACTS PENDING

350 tons, paving in Ventura county, California. Bids Oct. 24.
300 tons, school, Bleigh street, Philadelphia.
200 tons, apartment building, Commonwealth avenue, Chicago. Olsen & Urbain, architects.
175 tons, service building, Packard Motor Co., Boston; to be placed soon.
100 tons, church at Ballard, Wash. Bids being received.
100 tons, for United office building Niagara Falls, N. Y. Bids soon.

Production Index Steady

Washington, Oct. 2.—August index of production for the iron and steel industry was 121, compared with 121 for July and 102 for August of last year, taking 1923-1925 at 100, according to the department of commerce.

Nonferrous metals index of production for August was 116 compared with 112 for July and 108 for August of last year.

August iron and steel index for unfilled orders was 75 compared with 75 for July and 66 for August of last year.

Rails, Cars

More Cars Placed in September Than August—3800 Now Pending in West

PRELIMINARY estimates of total cars placed in September indicate 1406 as against 667 for August . In the West 3800 cars are pending and Louisville & Nashville may buy 2000. Santa Fe also is a possible car buyer. Donner Steel Co., divided a large locomotive order three ways. A trunk line bought 46,000 tons of rail. The Pennsylvania rail requirement may reach 272,000 tons.

RAILROAD TRACK PRICES, PAGE 934

New York, Oct 9..—Preliminary estimates for September indicate placing of approximately 1406 freight cars, as compared with 667 in August. This larger total included 1000 cars for the Great Northern and 200 for the Illinois Traction system.

An interesting development is the decision of the Lehigh Valley to scrap 4700 30-ton wooden coal cars. Some builders regard it as of particular significance in view of contemplated plans of the American Railway association to restrict the use of all-wood freight cars after Jan. 31, 1930. Another rather significant development is the refusal of the local transit commission to grant the Brooklyn-Manhattan Transit Co. permission to convert wooden cars on its line by strengthening the under carriages.

Pittsburgh, Oct. 9.—Track accessory buying shows a slight improvement, although demand still is of the hand-to-mouth variety. The same applies to light rails, with demand from coal mining districts slightly less active than a short time ago. No improvement is noted in the slow rate of car buying.

Chicago, Oct. 9.—Definite inquiry has developed for new rolling stock from the railroads. American Refrigerator Transit and Missouri Pacific each is in the market for 1000 refrigerator cars, and Great Northern railroad is asking bids on 1000 ore and 500 gondola cars. Northern Refrigerator Co. will buy 300 refrigerator cars. Reports that Louisville & Nashville will buy 2000 miscellaneous freight cars have not been verified here. It is reported also that the Santa Fe will announce an inquiry for new equipment soon.

A trunk line railroad has purchased 46,000 tons of rails, about 30 per cent of which will go to Western mills. It now is understood here that the maximum requirements of the Pennsylvania rail inquiry will be 272,000 tons, including option figures. Chesapeake & Ohio has practically closed on its 12,000 to 15,000 tons of track accessories, and Great Northern has placed an additional lot of its total of 5000 to 7000 tons. Capacity of departments making track fastenings is rated at 70 to 75 per cent. Rail mill operations for the district are not much over 50 per cent, but it is indicated they must be stepped up soon.

CAR ORDERS PLACED

C. C. B. Smokeless Coal Co., subsidiary of Massachusetts Gas Companies, 50 mine cars and 125 trucks, to the Watt Mining Car Wheel Co.; was previously noted as involving 5025 coal car trucks.
Chicago, Burlington & Quincy, 498 composite gondolas, rebuilding at own shops at Galesburg, Ill.
Pennsylvania railroad, 1000 steel box cars to Altoona, Pa., shops. These shops also will increase capacity of 983 gondolas from 50,000 to 70,000 pounds by substituting heavier trucks.

LOCOMOTIVES PLACED

Donner Steel Co., Buffalo, 300 horsepower oil electric locomotives, to be built jointly by American Locomotive, General Electric and Ingersoll-Rand companies.

CAR ORDERS PENDING

American Refrigerator Transit Co., 1000 refrigerator cars.
Canadian National Railways inquiring for 300 flat cars and 20 miscellaneous coaches in addition to 1500 box cars, 30 tank cars and 43 miscellaneous coaches noted previously.
Delaware, Lackawanna & Western, two steel dining cars.
Fruit Growers' Express, New York; three pushcarts.
Great Northern, 1000 ore cars and 500 gondolas.
Missouri Pacific, 1000 refrigerator cars.
Northern Refrigerator Co., 300 refrigerator cars.

LOCOMOTIVES PENDING

Delaware & Lackawanna railroad, 20 locomotives.
Rio Grande Western railroad, 10 locomotives.

Refractories

Small Lot Buying Rules, with Small Stocks—Prices Are Firm

REFRACTORIES PRICES, PAGE 934

Pittsburgh, Oct. 9.—Users of refractory material are buying in small lots but the aggregate is fairly high and compares favorably with the rate of a year ago. Sellers continue handicapped by the refusal of users to carry stocks and are forced to make quick shipments. Current activity is almost wholly from repair work, new installations being few. About 600,000 brick will be required for a blast furnace now under construction at the Aliquippa works of the Jones & Laughlin Steel Corp.

Strip

Specifications Hold Well and Exceed September in Some Cases—Prices Firm at Former Level

LARGER volume of specifications for strip steel is encountered in most producing centers and practically all important users have made contracts for fourth quarter needs. Automotive consumers show no diminution in requirements. Prices are being held firmly at established levels, though some contracts were made at lower levels.

STRIP PRICES, PAGE 934

Pittsburgh, Oct. 9.—Any change recently in the volume of business in hot rolled strips has been for the better, and shipments are practically equal to new buying, with the result that backlogs of mills continue at recent high levels. Automotive users show no decline in buying. Mills are firm in quoting 2.20c for sizes under 3-inch, 2.10c on 3 to 6-inch, and 1.90c on 6 to 12-inch on any new business, although some fourth quarter contracts are in effect at lower figures. Spot business for cold rolled strip steel takes a 2.85c price, with some business being specified at 2.75c.

New York, Oct. 9.—Specifications for strip steel, while not as large as the latter part of September, are at a fair rate. There has not been a real test of prices because important buyers generally are under contract for fourth quarter at old prices. There has been some business in 6 to 12-inch widths of hot strip at as low as 1.85c, base, Pittsburgh but this is exceptional and 1.90c is the usual figure. There is more disposition to observe the differential between widths from 3 to 6 inches and widths under 3 inches, the prices for the former ranging from 2.00c to 2.10c, base Pittsburgh, while the usual figure for the material under 3 inches is 2.20c. On cold rolled strip steel the prices continue to range from 2.75c to 2.85c, base, Pittsburgh, with some mills refusing to shade 2.85c.

Philadelphia, Oct. 9.—Strip steel demand only is fair but of sufficient proportions to afford a test of prices. Hot strips are now generally quoted at 1.90c, Pittsburgh, on 6 to 12-inch while in some instances a minimum of 1.85c was done. On widths under six inches prices usually range from 2.00c to 2.10c, Pittsburgh, with but a limited amount going as high as 2.20c. Cold strip prices range from 2.75c to 2.85c, Pittsburgh.

Cleveland, Oct. 9.—Demands for strip steel would indeed be at a low ebb were it not for the sustained automotive demand. Some hot strip producers offer two or three weeks' delivery, while shipments of cold are four or five weeks deferred. One maker now is offering Nov. 10 to 17 datings. Prices are more clarified on cold than on hot with 2.75c on contracts and 2.85c named on spot shipments. Some have contracts at the latter figure. Shipments are made on fourth quarter hot strip contracts at 1.85c for wide material only one or two large users getting them for less. Some spot sales are noted at 1.90c. Intermediate widths are quotable at 1.90c to 2.00c, while narrow hoop and band stock brings 2.10c to 2.20c. Makers of the latter have good order books.

Chicago, Oct. 9.—Cold rolled strip specifications and sales have gained perceptibly in the past few weeks. Operations now are close to capacity. Hot rolled mills are operating at about 80 per cent. Automotive demand continues to lead, with parts makers active. An automotive builder near the Chicago district announces his schedule for October at practically the same as last month. Cold rolled strip prices are reported firm at 2.75c to 2.85c, Pittsburgh and Cleveland, quantity buyers getting 2.75c. Hot strip prices are 1.85c to 2.30c, Chicago.

Cold Finished Steel

Automotive Buying Heavy and Most Contracts Made

COLD FINISHED PRICES, PAGE 933

Pittsburgh, Oct. 9.—Automotive specifications for cold finished steel are heavier than had been anticipated, with most large users who not affected by model changes continue to buy at the active September rate. The price situation is satisfactory in that no shading is reported of 2.20c, Pittsburgh, for fourth quarter. Practically all users are under contract.

Cleveland, Oct. 9.—Specifications from parts makers, largely automotive, are commencing to come in to cold bar finishers, applying on fourth quarter contracts, taken at 2.25c, Cleveland. This is true despite the fact orders broke a record for September and included no doubt some speculative tonnage because of the $2 advance. In some quarters deliveries are deferred as much as several weeks. Plant operations necessarily are high.

Wire

Most Selling Is to Manufacturers—Nails Not Active—Prices Are Holding Firm

MANUFACTURERS using wire for production of their goods continue to take a large tonnage of wire, while jobbers are not buying freely, their stocks being fairly heavy. Holiday trade is having some effect in enlarging manufacturers' activities. Prices are more stable and less opposition is encountered by sellers. Nails continue only fairly active.

WIRE PRICES, PAGE 934

Chicago, Oct. 9.—Western wire mills report encouraging activity in sales of manufacturers' wire. Jobber buying is not picking up as rapidly as had been expected and operations remain at 70 to 75 per cent. The coming holiday trade already is stimulating business in manufacturers' wire. Stocks of nails and plain wire are fairly heavy on jobbers' floors. Mills report wire products' prices much more stable on the basis of 2.45c, Chicago or Western mills, for bright plain wire, and $2.60 for wire nails.

Cleveland, Oct. 9.—Plain wire specifications continue numerous from spring makers and other large users. From time to time jobbers order mixed carloads of wire products with an occasional straight carload of nails. Some automobile interests recently were large purchasers of nails for crating. Nail producers predict that before the month is out nails will have advanced $2 to $2.65 but they do not believe such an announcement would stimulate demand in any way. Plain wire is firm at 2.40c; wire nails at $2.55.

Pittsburgh, Oct. 9.—Buying of merchant steel wire so far this month compares favorably with the September rate. Opposition to current prices is noted in only a few instances and practically all users have signed fourth quarter contracts at 2.40c, Pittsburgh, for plain wire and $2.55 for wire nails. Sellers are firm at these levels. Nails are only fairly active.

S. S. Robinson Is Named

Chicago, Oct. 9.—S. S. Robinson, formerly district manager, Pickands, Mather & Co., at Erie, Pa., has been appointed assistant sales manager of Pickands, Brown & Co., at Chicago.

Nonferrous Metals

New Buying Is Routine Although Shipments on Old Orders Are Heavy—Prices Strong Throughout List Except on Tin

Prices of the Week, Cents a Pound

	Copper, Electro delivered	Copper, Lake delivered	Casting refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead New York	Lead East St. Louis	Zinc St. Louis	98-99% Aluminum	Spot Antimony	Ingot Nickel
Oct. 3	15.25	15.32½	14.95	49.55	49.12½	6.50	6.32½	6.25	23.90	11.45	35.00
Oct. 4	15.25	15.32½	14.95	49.37½	49.00	6.50	6.32½	6.25	23.90	11.50	35.00
Oct. 5	15.25	15.32½	14.95	48.87½	48.50	6.50	6.32½	6.25	23.90	11.50	35.00
Oct. 8	15.25	15.32½	14.95	48.75	48.25	6.50	6.32½	6.25	23.90	11.50	35.00
Oct. 9	15.25	15.32½	14.95	48.62½	48.25	6.50	6.32½	6.25	23.90	11.37½	35.00

NEW YORK, Oct. 9.—Shipments of nonferrous metals are running extremely large, but new buying at present is only of routine nature. Quietness of the markets is natural at present, after the recent large activity in which order books were well filled. The prime western zinc market, unlike the others, has not yet experienced any stimulation.

Prices all through the list were firm this past week, with the exception of tin. A lack of buying of this metal caused a reaction from the strong prices of the previous week.

Brass and copper mills are well booked for two months, and some departments are well booked for the rest of the year. Prices are unchanged on the basis of 15.25c, Connecticut, for bar and ingot copper.

Copper—Light buying in the past week had been expected on account of the unusual size of September sales. Moreover, this quietness was welcomed by producers, as otherwise the market would have been driven into a dangerous position. Domestic users are well covered for October and November, and partly for December. Export business, which did not drop off quite so much in the past week as domestic, is now mostly for November. Prices are firm and unchanged.

Zinc—The market on prime western remains pegged at 6.25c, East St. Louis. Buying is routine, mostly for shipment within a month, but at times a little farther ahead. Producers are willing to accept orders at this level for the balance of the year. Statistics for September will appear in a day or two. High grade zinc is unchanged and continues to move in good tonnages.

Tin—The recent strong movement carried the market a little above 50.00c on spot tin about a week ago, but the lack of buying since then has sent the price below 49.00c. The premium of spot tin over futures also narrowed, partly due to the action of the market in London, and partly due to good supplies ahead. On Monday, however, the London positions drew a little farther apart again.

Consumption of tin continues near its top record, but supplies appear to be more than ample, and the latter fact explains the reason the market is not holding its recent strength well. Yet prices still retain a part of the rise made in September. Members of the trade have been unusually lacking in market opinions lately, and that is one reason for quietness. Users are believed to be moderately well covered.

Lead—New buying in the market has continued moderately active, and prices have remained firm at the levels to which they advanced late in September, 6.50c, New York, and 6.32½c, East St. Louis. Most of the buying has been for October and some for November.

Aluminum—Good business has been done in this market, mostly for early shipment, and it looks as if the total for the year would be well above the average. Importers have been taking less than their average proportion of the business, due mostly to the fact that European producers have had good markets at home.—*Daily Metal Trade.*

Mill Products

Base prices cents per pound f.o.b. mill

SHEETS	
Yellow brass (high)	19.75
Copper, hot rolled	24.00
Lead, full sheets (cut ¼c more)	10.00
Zinc sheet (100-pound base)	9.75
Zinc strip (100 pound base)	9.00
Aluminum, flat sheets, up to 10 gage, 3" to 72" wide	31.30
SEAMLESS TUBES	
Yellow brass (high)	24.62½
Copper	25.50
RODS	
Yellow brass (high, full turnings)	17.50
Naval brass	20.25
WIRE	
Copper, car lots	16.87½
Yellow brass (high)	20.25

Old Metals

Dealers' buying prices, cents per pound

HEAVY RED BRASS	
New York	9.75 to 10.00
Chicago	9.75 to 10.00
Cleveland	9.50 to 10.00
HEAVY YELLOW BRASS	
Chicago	7.00 to 7.25
Cleveland	7.75 to 8.00
ZINC	
New York	3.50
Cleveland	3.25
HEAVY COPPER AND WIRE	
New York	12.50
Boston	11.50 to 12.00
Chicago	11.50 to 12.00
Cleveland	12.50 to 12.75
RED BRASS BORINGS	
New York	8.75 to 9.00
YELLOW BRASS TUBING	
Cleveland	8.00 to 8.50
LIGHT COPPER	
New York	11.00
Chicago	10.25 to 10.50
Cleveland	11.25
LIGHT BRASS	
Boston	5.75 to 6.00
Chicago	6.25 to 6.75
Cleveland	6.00 to 6.25
ALUMINUM	
Clippings, Cleveland	17.50 to 18.00
Borings, Cleveland	8.50 to 9.00
Cast, Cleveland	12.50
Cast, Boston	10.50 to 11.00

Secondary Metals

Remelt Aluminum No. 12	15.50 to 16.00
Brass ingot, 85-5-5	13.00

Coke By-Products

Benzol Price Advancing and Deliveries Are Deferred

New York, Oct. 9.—Heavy demand for benzol is advancing the spot market, which is now holding at 22 to 23 cents, works, for material in tank lots and 27 to 28 cents in drums. One leading distributor now is unable to promise deliveries within three weeks, while usual delivery from the point of production has been two or three days.

Toluol demand also continues at a high rate with producers having no little difficulty in keeping up with specifications. Virtually none of this material is now available for spot delivery, although the market continues nominally at 35 cents, works, for toluol in tank lots and 40 cents in drums.

Lacquer manufacturers are using an ever increasing amount of commercial xylol, owing to a shortage of toluol. The spot market is firm at 30 cents, works, for material in tank lots and 35 cents in drums. Solvent naphtha is also holding at these prices, with demand moderate.

Spot sulphate of ammonia is moving in small quantities at $2.30, delivered.

Coke Oven By-Products

Per Gallon at Producers' Plants in Tank Lots

	Spot
Pure benzol	$0.22 to 0.23
90 per cent benzol	0.22 to 0.23
Toluol (nominal)	0.35
Solvent naphtha	0.30
Commercial xylol	0.30
Per Pound at Producers' Plants in 250-Pound Drums	
Phenol	0.17
Per Pound at Producers' Plants	
Naphthalene flakes	0.06 to 0.07
Naphthalene balls	0.06 to 0.07
Per 100 Pounds Delivered	
Sulphate of ammonia	$2.30

Warehouse

Philadelphia Jobbers Advance Prices—Others Seek Volume Tonnage at Old Levels—Western Business Better Than Average

OCTOBER is living up to its precedential reputation, that month and March being the two best selling periods of the year for jobbers. Increasingly deferred mill deliveries redound to their benefit in most sections. Automotive demand is still a feature, with building construction, machine shop, agricultural implement and many other buying lines represented in orders of a most diversified character from scattered buyers. Jobbers are seeking to gain tonnage volume by adhering to present price levels.

Philadelphia — Jobbers have advanced bars, plates, shapes, hoops, bands and blue annealed sheets $2 per ton. They also have applied regular sheet quantity differentials to blue annealed sheets, placing all steel products on the same quantity differential basis. Jobbers have not followed the mill reduction in cash discount except to some extent in cold-finished steel. Regular terms on all products out of warehouse here are 2 per cent for cash within 15 days. Some jobbers are allowing these 2 per cent on cold finished bars while others were allowing only ½ of 1 per cent in ten days. The latter discount now applies on cold strip.

New York—By applying the new cash discount to sheets and cold rolled strip steel jobbers have virtually all their major products on the same discount basis. Exceptions are tubing (notably seamless tubing) and bolts, nuts and rivets. Trading generally is brisk. Reinforcing bar orders are numerous.

Buffalo—Warehouses have just enjoyed the best business week of the year. Slowing up of mill deliveries together with an accumulation of rush orders for fall construction and other work, brought out a large volume of business. Warehouse operators will probably seek larger volume by holding to old price schedules this quarter.

Cleveland—Current warehouse activity is holding up to its reputation for heavy shipments, October usually being a big buying month. Aggregate tonnage to date is well ahead of the same period in September.

St. Louis—Business is somewhat better than the average at this season. General manufacturing trade has improved. Delayed mill deliveries on sheets have redounded to the benefit of jobbers. Automobile shops, implement and machinery manufacturers have been heavy buyers.

Warehouse Quotations in Cents Per Pound at Leading Market Centers

STEEL BARS

Baltimore	3.10c
Boston	3.265c
Buffalo	3.30c
Chicago	3.00c
Cincinnati	3.30c
Cleveland	3.00c
Detroit	3.00c
Ft. Worth	3.50c
Houston	3.00c
Los Angeles	3.30c
New York †††‡	3.25c
Philadelphia*	2.80c
Pittsburgh	2.90c
Portland	2.50c
San Francisco	3.15c
Seattle	3.90c
St. Louis	3.15c
St. Paul	3.25c
Tulsa	3.75c to 4.04c

IRON BARS

Baltimore	3.10c
Boston	3.265c
Buffalo	3.30c
Chicago	3.00c
Cincinnati	3.30c
Detroit	3.00c
Ft. Worth	3.50c
New York††	2.80c to 3.24c
Philadelphia*	2.70c
St. Louis	3.15c
Tulsa	3.75c to 4.04c

REINFORCING BARS

Baltimore	3.31c
Boston	3.265c to 3.50c
Buffalo	2.75c
Cincinnati	3.15c
Cleveland	2.25c to 3.00c
Detroit	2.30c to 3.00c
Ft. Worth	3.50c
Houston	3.00c
Los Angeles cl.	2.65c
Los Angeles lcl.	3.00c
New York	2.80c to 3.24c
Philadelphia	2.85c
Pittsburgh	2.75c to 3.175c
San Francisco cl.	2.00c
San Francisco lcl.	2.25c
Seattle	3.00c
St. Louis	3.15c
Tulsa	3.75c to 4.00c
Youngstown	2.30c to 2.60c

STRUCTURAL SHAPES

Baltimore	3.10c
Boston	3.365c
Buffalo	3.40c
Chicago	3.10c
Cincinnati	3.40c
Cleveland	3.00c
Detroit	3.10c
Ft. Worth	4.00c
Houston	3.25c
Los Angeles	3.30c
New York†††‡	3.25c to 3.30c
Philadelphia*	2.70c
Pittsburgh	3.00c
Portland	2.90c
San Francisco	3.15c
Seattle	3.00c
St. Louis	3.25c
St. Paul	3.35c
Tulsa	3.75c to 4.14c

PLATES

Baltimore	3.10c
Boston	3.365c
Buffalo	3.40c
Chicago	3.10c
Cincinnati	3.40c
Cleveland, ¼-in. and thicker	3.00c
Cleve., 3/16-in.	3.20c
Detroit	3.10c
Detroit, 3/16-in.	3.30c
Ft. Worth	4.00c
Houston	3.00c
Los Angeles	3.30c
New York‡‡	3.30c
Philadelphia*	2.70c
Phila., 3/16-in.*	2.90c
Pittsburgh	3.00c
Portland	3.00c
San Francisco	3.15c
Seattle	3.00c
St. Louis	3.25c
St. Paul	3.35c
Tulsa	3.75c to 4.14c

NO. 10 BLUE ANNEALED

Baltimore	3.45c
Boston, 3/16-in.	3.915c
Buffalo	3.50c
Chicago	3.35c
Cincinnati	3.45c
Cleveland	3.25c
Detroit	3.35c
Ft. Worth	4.50c
Houston	3.90c
Los Angeles	4.00c
New York‡‡	3.90c
Portland	3.75c
Philadelphia	3.15c
Pittsburgh**	3.00c to 3.10c
San Francisco	3.90c
Seattle	4.00c
St. Louis	3.45c
St. Paul	3.75c
Tulsa	4.20c to 4.54c

NO 24 BLACK SHEETS

Baltimore	3.10c to 4.00c
Boston	5.00c
Buffalo	4.20c
Chicago	3.80c
Cincinnati	3.90c
Cleveland	3.50c
Detroit	3.95c
Ft. Worth	4.70c
Los Angeles	4.90c
New York†††	3.70c to 3.80c
Philadelphia*†	3.85c
Pittsburgh‡	3.50c to 3.55c
Portland	4.90c
San Francisco	4.95c
Seattle	5.00c
St. Louis	4.10c
St. Paul	3.95c
Tulsa	4.34c

NO. 24 GALVANIZED SHEETS

Baltimore	4.10c to 4.75c
Boston	5.85c
Buffalo	4.70c to 4.85c
Chicago	4.65c
Cincinnati	4.75c
Cleveland	4.35c
Detroit	4.75c
Ft. Worth	5.50c
Houston	5.30c
Los Angeles	5.30c
New York†††	4.25c to 4.50c
Philadelphia*†	4.60c
Pittsburgh‡	4.40c
Portland	5.50c
San Francisco	5.40c
Seattle	5.50c
St. Louis	4.95c
St. Paul	4.90c
Tulsa	6.50c

BANDS

Baltimore	3.85c
Boston	4.015c to 5.00c
Buffalo	4.05c
Chicago	3.65c
Cincinnati	3.95c
Cleveland	3.65c
Detroit	3.65c
Ft. Worth	4.25c
Houston	3.65c
Los Angeles	4.15c
New York‡‡	4.00c
Philadelphia*	3.35c
Pittsburgh	3.60c
Portland	3.75c
San Francisco	4.10c
Seattle	4.00c
St. Paul	3.90c
Tulsa	4.50c to 4.66c

HOOPS

Baltimore	4.00c
Boston	5.50c to 6.00c
Buffalo	4.05c
Chicago	4.15c
Cincinnati	4.25c
Cleveland	3.65c
Detroit	4.15c
New York‡‡	4.50c
Philadelphia*	3.60c
Pittsburgh	4.50c
Seattle	5.00c
St. Paul	4.40c

COLD FINISHED STEEL

	Rounds, hexagons,	Flats, squares
Baltimore	3.35c	3.85c
Boston	3.55c	4.05c
Buffalo	3.95c	4.45c
Chicago	3.60c	4.10c
Cincinnati	3.85c	4.35c
Cleveland	3.65c	4.15c
Detroit	3.85c	4.35c
Los Angeles (a)	4.50c	.....
New York	3.50c	4.00c
Philadelphia*	3.45c	3.95c
Pittsburgh	3.60c	4.10c
Portland (a)	4.75c	.....
San Fran. (a)	4.25c	.....
Seattle (a)	5.00c	.....
St. Paul (a)	3.85c	.....
Tulsa	4.76c	5.26c

(a) Rounds only.

COLD ROLLED STRIP

Boston, 0.100-inch, 500 pound lots	5.30c
Buffalo	5.85c
Chicago (b)	6.10c
Cincinnati	7.15c
Cleveland (b)	5.95c
Detroit	5.80c
New York	5.15c
Philadelphia (c)	5.00c

(b) Net base, straightening, cutting, boxing 1 ton or more.
(c) Plus mill, size and quantity extras.

SWEDISH IRON AND STEEL

New York duty paid

Hollow drill steel	14.00c
Iron bars, rounds	6.25c

Flats and Squares

Baltimore, New York, Phila.	6.00c

*Plus quantity differentials. ‡‡Minus quantity differentials. ††Domestic bars. ‡10 to 24 bundles. **25 or more sheets. *†50 or more bundles. †††Newark-Jersey City 4.00c on black and 4.70c on galvanized the more prevalent figures.

Pacific Coast

Plate Demand for Oil Tanks Continues Feature — Pipe Buying Light

PLACING of part of its inquiry for oil tanks by the General Petroleum Corp., requiring 1600 tons of plates, is a feature of the Pacific coast market. Tanks not yet covered involve more than this quantity of plates. Concrete bar awards bring the year's total well above the same period of last year. Oil country goods continue actively in demand.

San Francisco, Oct. 9.—(*By Air Mail*)—Demand for iron and steel products continues well sustained. Among awards of the week was 1600 tons of plates for four 134,000-barrel tanks for the General Petroleum Corp., Los Angeles, with the Western Pipe & Steel Co., and 650 tons of shapes for an office building at Tucson, Ariz., to McClintic-Marshall Co.

The East Bay municipal utility district, Oakland, has purchased the property of the East Bay Water Co. and has abandoned its plan for installing new distributing mains, bids on which were opened Aug. 17. This project originally called for 7200 tons of plates or 22,325 tons of cast iron pipe ranging in size from 24 to 44 inches.

Pig Iron and Coke

Little of importance took place in the market for foundry pig iron and coke during the week. Sales and inquiries called for small lots. No change in quotations has been made.

Coast Pig Iron Prices

Utah basic	$25.00 to 26.00
Utah foundry	25.00 to 26.00
*German	24.25
*Indian	24.00 to 25.00

*C.i.f. duty paid.

Bars, Plates and Shapes

Concrete bar awards this week totaled 1625 tons and brought the aggregate for the year to 70,060 tons as compared with 44,798 tons for the corresponding period in 1927. Among the larger lots were 900 tons for an office building in San Francisco, placed with Gunn, Carle & Co., and 225 tons for an apartment in Los Angeles, taken by an unknown interest. Pending business now exceeds 9000 tons, new inquiries including 350 tons for highway work in Ventura county, Calif., and 100 tons for a church at Seattle. Out-of-stock quotations on Los Angeles and San Francisco remain low, 1.80c base being the usual figure named on most tonnages.

General Petroleum Corp., Los Angeles has placed four 134,000-barrel tanks involving 1600 tons of plates. This company originally put an inquiry out for fourteen 82,000-barrel or nine 134,000-barrel tanks, involving close to 5000 tons of material. It is understood that five additional 134,000-barrel tanks, calling for 2000 tons, will be placed next week. The Shell Oil Co. still has its inquiry out for ten 80,000-barrel tanks, involving 3100 tons, for the Dominguez plant. Bids will be opened Oct. 10 for 1200 tons for the Hood River, Oreg., pipe line. Seattle will open bids Oct. 26 for a 24-inch pipe line involving 231 tons of riveted pipe or 1824 tons of cast iron pipe. Plate prices appear to be firming and 2.20c to 2.25c is the range at present.

Demand for structural shapes continues well sustained. Among the awards reported were 275 tons for an office building at Long Beach, Calif., taken by the Llewellyn Iron Works and 400 tons for a hangar at Sand Point, Wash., booked by an unknown fabricator. The majority of new inquiries call for lots of less than 100 tons. Bids are being taken on 300 tons for an apartment on Hillcrest street, Los Angeles and on 100 tons for a church at Pasadena, Calif. No change in price has occurred on plain material, 2.35c c.i.f. being firm.

Other Finished Material

Trading in cast iron pipe has not been heavy and awards this week totaled 583 tons. The United States Cast Iron Pipe & Foundry Co. secured 142 tons for Oxnard, Calif., and Seattle placed 282 tons for the Sixth Ave. N. W. project with S. A. Moceri. No action has yet been taken on 537 tons for Phoenix, Ariz. Bids were opened this week on 1266 tons for Los Angeles. A better movement of standard steel pipe is reported but no large sales or inquiries are noted. Oil country goods continue active in the Los Angeles district.

Urges Winter Building

Philadelphia, Oct. 9.—A comprehensive program for educating the general public to the economies of winter construction was formulated at a recent meeting of a committee of the Philadelphia building congress. This will be attempted through the issuance of bulletins, and other media showing the possibility of savings in labor and material when construction is carried on during winter months.

According to Frank Parker, vice chairman. the committee stands ready to co-operate with contractors, architects and others within 100 miles of Philadelphia. The committee, he said, will be ready at all times to render expert service without cost.

Locomotive Orders Up

Washington, Oct. 9.—Shipments of industrial locomotives in September gained slightly over the August total, according to the department of commerce report. Following are comparisons by months:

Year and Month	Shipments Domestic Total	Steam	Electric	Unfilled orders Domestic Total	Steam	Electric
1927						
Sept.	127	86	7	271	167	49
Total (9 mos.)	838	573	116	.....	.....	.....
Oct.	112	81	12	182	97	45
Nov.	52	31	7	145	74	42
Dec.	72	41	13	232	178	39
Total 1927	1,074	726	148	.....	.....	.....
1928						
Jan.	47	22	23	222	161	38
Feb.	59	43	11	204	146	40
March	70	44	15	178	123	37
April	46	38	6	188	129	41
May	41	29	10	220	138	39
June	51	39	11	201	109	37
July	46	19	5	198	98	59
Aug.	34	23	4	204	135	26
Sept.	41	28	2	178	118	27
Total (9 mos.)	435	285	87	.....	.....	.....

Plate Orders Increase

Washington, Oct. 9.—New orders for fabricated steel plate increased in August over July, department of commerce statistics show. Monthly comparisons follow:

	*Total	Oil storage tanks	Gas holders	Blast furnaces	Stacks and miscellaneous
1926 (year)	513,913	175,367	47,524	14,406	196,849
1927					
Aug.	48,577	29,691	3,504	481	11,385
Total, 8 mos.	348,956	154,618	29,238	4,859	121,261
Sept.	38,662	15,421	2,254	873	14,576
Oct.	47,090	18,648	3,252	385	11,599
Nov.	27,341	8,920	978	422	10,794
Dec.	35,648	13,367	3,490	385	13,088
Total (year)..	497,697	210,974	39,212	6,924	171,318
1928					
Jan.	35,787	8,758	2,062	1,225	16,412
Feb.	49,820	25,532	3,679	143	15,420
March	46,840	25,226	1,897	699	14,683
April	50,347	22,095	4,654	619	16,265
May	42,376	14,849	4,636	202	17,768
June	35,202	12,204	3,225	778	15,803
July	*35,959	16,881	1,848	499	*12,159
Aug.	47,245	24,807	1,814	429	17,579
Total, 8 mos.	343,576	152,695	23,815	4,594	127,089

*Revised

To Add Sheet Capacity

Pittsburgh, Oct. 9.—American Sheet & Tin Plate Co. has started a program of expansion and replacement at its Vandergrift, Pa., plant. The company has been handicapped by lack of annealing capacity, and an additional normalizing furnace will be installed. The cold rolling and finishing departments also will be affected by the changes which will require several months to complete. The remodeling is not expected to affect the number of employes.

Valley Steelworks Now on Higher Operations

Youngstown, O., Oct. 9.—Practically capacity rates of operations have been reached by independent open-hearth steelmakers in this district, and were it not for the two-turn bessemer operating rates, the valley would be on practically capacity basis for the first time in several years. Out of 53 independent open-hearth units, 49 are active this week, while the Carnegie Steel Co. has 14 active out of a total of 15 at the Ohio works. Independent sheet mills have 113 units active out of 127, while strip and tin mills are running at capacity. Steel bar operations are at 75 per cent with independents and 80 per cent for the Carnegie company. Fourteen seamless and welded tube units are going out of a total of 20. The Girard puddling mill maintains 60 per cent activity, and its skelp department is 80 per cent active.

Arc Welding Is Subject of Lecture Tour

A lecture tour covering a large part of the United States is being made by Professor Frank P. McKibben, well-known consulting structural and bridge engineer who is associated with the General Electric Co., Schenectady, N. Y. The tour will comprise a series of lectures made in response to invitations from various societies throughout the country, on the application of electric arc welding to the construction of buildings, based on the experiences of the General Electric Co. and other engineers in this field.

The schedule of Professor McKibben's appearances is not complete as yet but among the cities which he will visit are: Philadelphia; Providence, R. I.; Pittsburgh; Baltimore; Columbus, O.; Chicago; Des Moines, Iowa; St. Louis; Kansas City, Mo.; Denver; Los Angeles; San Francisco; Seattle; Birmingham, Ala.; and Atlanta, Ga.

"Electric Welding of Steel Buildings and Bridges," is the title of Professor McKibben's talk. It takes about one hour for delivery, and a discussion of one or two hours usually follows. The speaker started his itinerary Oct. 4 and expects to finish about March 4.

Fire Hinders Temporarily

Reading, Pa., Oct. 9.—Within two days after its disastrous fire, caused on Oct. 6, when two gas tanks exploded, the Carpenter Steel Co., had awarded contracts for new buildings to the Austin Co., for partial completion in 30 days. Reconstruction will be complete within 45 days. In the meantime all hot mills with the exception of one small unit now are in operation or will be during the present week. The round wire department was affected only to a moderate extent but the flat wire department was badly damaged, being completely unhoused. New machinery, however, now is en route to Reading so that production can be pursued with but temporary interruption to shipments on contracts. The melting, annealing, forge, rod mill and other departments are in no way affected by the fire. Arrangements have been completed to take care of all customers without delay.

Enameled Ware Rises

Washington, Oct. 9.—August shipments of enameled sheet metalware increased notably over the July figure, statistics of the department of commerce show. Monthly comparisons follow:

1927	In dozens Total	White	Gray	Colored
August	329,843	176,772	134,737	18,334
Tot. 8 mos.	2,689,631	1,414,571	1,130,206	144,854
September	310,823	172,241	114,669	23,913
October	322,081	169,351	126,344	26,386
November	287,115	153,283	106,104	27,728
December	307,280	161,922	119,885	25,473
Tot., 1927	3,916,930	2,071,368	1,597,208	248,354
1928				
January	319,871	155,172	132,136	32,563
February	372,848	179,794	131,485	61,569
March	442,689	200,010	152,895	89,784
April	351,034	143,470	123,808	83,756
May	348,661	158,458	116,541	73,662
June	299,078	141,486	95,959	61,633
July	*277,684	*125,653	108,584	43,447
August	358,811	164,580	134,191	60,040
Tot. 8 mos.	2,770,676	1,268,623	995,599	506,454

*Revised.

Galvanized Ware Gains

Washington, Oct. 9.—An increase was noted in the August production of galvanized pails and tubs over July, according to department of commerce statistics. Following are monthly comparisons:

	PAILS, (In dozens) Production	Shipments	TUBS, OTHER WARE Production	Shipments
Aug.	133,309	148,148	44,632	48,291
Tot. 8 mos.	1,183,659	1,212,002	290,606	289,350
Sept.	127,608	127,530	37,776	44,852
Oct.	151,495	141,101	39,066	41,368
Nov.	112,690	110,275	35,602	28,578
Dec.	93,273	90,254	22,090	17,013
Total 1927	1,668,725	1,688,162	425,080	421,161
1928				
Jan.	125,536	149,304	32,678	35,689
Feb.	165,757	162,153	28,513	26,334
March	173,599	175,472	50,904	45,205
April	208,544	201,119	31,545	36,452
May	177,170	155,561	39,206	35,143
June	141,448	144,385	48,038	*44,833
July	114,343	121,415	61,688	47,856
Aug.	127,797	142,487	37,846	44,377
Tot. 8 mos.	1,246,252	1,265,868	333,514	318,640

Pig Iron Demand Active

(*Concluded from Page* 935)

continues firm. The outstanding feature of the market is the continued heavy shipments. Since Oct. 1 a number of foundries have increased their activities, and the total melt this month is likely to be the largest of any month so far this year. Sales of pig iron in the past week totaled about 5000 tons. The largest single item was 1500 tons of malleable to an Illinois shop.

Birmingham, Ala., Oct. 9.—Large melters of pig iron have purchased liberally for fourth quarter. Unfilled tonnage with the furnace companies is fairly good. Woodward Iron Co. will blow in a fourth furnace this week. Production of iron in October will be about 7 per cent larger than it was in September. Deliveries still exceed output. The base price of $16.25 is firm.

Toronto, Ont., Oct. 9.—With practically all melters who cover quarterly needs by contract taken care of up to the end of the year, advance buying of pig iron has disappeared, and current demand for foundry and malleable pig iron is confined to spot delivery sales.

Youngstown, O., Oct. 9.—Strengthening of the basic pig iron market here has been the notable trade event of the past week, this being due to a temporary shortage in the open market supply of basic in the valleys. The few producers now blowing are requiring all their own output, due to vastly expanded steelworks operations here, and what surplus basic remains is being held at $17, valley. The producers of bessemer pig iron are asking $18, valley, and also ask $17.50 for malleable, with small sales of No. 2 foundry being made from time to time at $17, valley. Small lots of low-phosphorus iron are being made to steel foundrymen right along at $26.50, valley, although a fair-size lot of that grade also has been sold at $27, valley. More inquiry is out at this time for basic, low-phos and bessemer than in several months.

Philadelphia, Oct. 9.—Heavy consumption of basic iron exceeds recent expectations. The current market has advanced to $19.65 to $20, delivered, eastern Pennsylvania consuming points. Foundry iron consumption is increasing. One eastern Pennsylvania producer has begun to quote $20.50, base, furnace, on foundry, an advance of 50 cents, but $20 still can be done. Producers generally consider $20.50, base, furnace, as minimum for first quarter.

Machine Shop Division in Joint Session

At the national meeting of the American Gear Manufacturers association to be held in Buffalo, Oct. 11-13, a joint session is scheduled in which the machine shop division of the American Society of Mechanical Engineers will co-operate. The session will be held at 8 p.m. in Hotel Statler and papers will be presented dealing with high-speed gearing requirements and a description of a gear-shaving process. Discussion will follow.

Executives of Machinery Associations Meet

Representatives of 13 trade associations connected with the machinery industry met at Montauk Point, Long Island, N. Y., Sept. 29, to discuss problems facing them. W. H. Rastall, chief of the industrial machinery division, department of foreign and domestic commerce, was one of the principal speakers. He stated that machinery ranks second in the United States, exceeded only by the textile industry.

Mr. Rastall pointed out that the machinery industry is fundamental in the United States and that few people realize the advantages possible due to machinery. Citing the unsound condition existing, however, he stated that 51.8 per cent of all companies reporting income tax in the machine tool and metalworking machinery group showed no profits. The cause for this condition was the subject of much discussion.

The meeting was called to order by Philip P. Gott, assistant manager, trade association department, chamber of commerce, who was elected secretary of the conference. E. F. DuBrul, business manager of the National Machine Tool Builders association, was elected chairman. In outlining the possibilities through cooperation of the various associations, Mr. DuBrul presented the following subjects: Wasteful buying, misrepresentation of materials, free engineering service, period for which patterns should be held and unlimited maintenance service.

H. C. Dunn, domestic commerce division, department of commerce, spoke on obsolescence as a factor in industrial equipment. He stated that the government would make no survey on obsolescence of industrial machinery unless requests for such were made from the industry.

It was proposed to call a meeting about Nov. 15 to continue discussions on unfair practices and with particular emphasis upon the classifications to be used in making the next census.

In addition to the 13 representatives of trade associations, three officials of the government and a representative from the trade association department of the United States chamber of commerce attended. Those at the meeting included: C. M. Haskins, Waste Material Dealers association; Verne E. Minich, Foundry Equipment Manufacturers association; C. R. Dimm, Flour Mill Machinery Manufacturers association; W. S. Hays, Power Transmission association; R. M. McClure, National Laundry Allied Trades association; John W. Ogren, Elevator Manufacturers Association of the United States; C. W. Conner, American Road Builders association; J. R. Boyd, National Crushed Stone association; C. B. LePage, American Society of Mechanical Engineers; E. P. Essley, Association of Machine Tool Dealers; Harry Botsford, Society for Development of Internal Combustion Power; R. H. Hudson, assistant director, bureau of standards; W. H. Rastall, Mr. Dunn, Mr. DuBrul and Mr. Gott.

Report Gain in Fluorspar Tariff is Recommended

Washington, Oct. 9.—While, in accordance with the usual custom, officials of the tariff commission refuse to discuss the fluorspar report, it is understood that the commission has taken official action on the report and that it will be forwarded to the President within a few days. The report is understood to be favorable to a tariff increase of 50 per cent, the full amount allowable under the flexible tariff section of the law.

The present rate of duty on fluorspar is $5.60 per ton long, and with the 50 per cent increase, the duty would be $8.40. The application for an increase in fluorspar duty was made to the commission by the domestic producers.

The statement of information made public some months ago by the commission indicated that the cost of production in the United States was higher than the foreign cost of production by more than the maximum permissible increased duty under the law on the bulk of the product. The preliminary report showed a justification for the increase and while the commission does not make recommendations to the President it will indicate clearly by its cost figures that a tariff increase should be made.

Chicago Operations Cling to 81 Per Cent Rate

Chicago, Oct. 9.—The total number of active blast furnaces at steelworks in this district was reduced in the past week to 23 out of 36 by the blowing out of one stack by the Inland Steel Co. for relining. The average steelworks operating rate in the district still is 81 per cent, as structural mill operations are higher than a week ago. Plate mills are operating at 80 per cent, and bar mills at capacity.

The Great Lakes Shippers' Advisory board meets at Cleveland, Sept. 20.

Steel Treaters Nominate Zay Jeffries

Philedalphia, Oct. 9.—Dr. Zay Jeffries, consulting engineer and director of the research bureau, Aluminum Co. of America, Cleveland, has been nominated for the presidency of the American Society for Steel Treating. In presenting its reports to the tenth annual convention of that sociey being held in this city this week, the nominating committee proposed R. G. Guthrie, chief metallurgist, Peoples Gas Light & Coke Co., Chicago, for vice president; F. T. Sisco, chief of the metallurgical laboratory, United States air corps, war department, Wright field, Dayton, O., for director, and A. H. d'Arcambal, metallurgist, Pratt & Whitney, Hartford, Conn., for director. W. H. Eisenman, 7016 Euclid avenue, Cleveland, was again nominated for secretary. Election will be by mail ballot this fall, the new officers to assume their duties in January, 1929.

Remaining on the board of directors are President F. G. Hughes, vice president, New Departure Mfg. Co., Bristol, Conn.; Treasurer J. M. Watson, metallurgist, Hupp Motor Car Corp., Detroit; T. E. Barker, president, Accurate Steel Treating Co., Chicago; and W. H. Phillips, vice president, Molybdenum Corp. of America, Pittsburgh. Retiring from the board are J. Fletcher Harper, research engineer, manufacturing department, Allis-Chalmers Mfg. Co., Milwaukee; L. D. Hawkridge, vice president, Hawkridge Bros. Co., Boston; and J. H. Nead, chief metallurgist, American Rolling Mill Co., Middletown, O.

The eleventh annual convention and National Metal exposition of the society will be held in the Public auditorium, Cleveland, Sept. 9-13, 1929. It is probable that the American Welding society and Institute of Metals division of the American Institute of Mining Engineers again will co-operate by conducting simultaneous meetings.

Some Fluorspar Sales

New York, Oct. 9.—Several moderate sales of metallurgical fluorspar have been made by importers during the past couple of weeks around $15.50 per net ton, duty paid tidewater, for the 85 and 5 per cent grade.

Production of zinc in Arizona fell from 12,946,423 pounds in 1926 to 2,268,960 pounds in 1927.

Industrial Men in the Day's News

F. Hughes Moyer, President, Mackintosh-Hemphill Co.

AFTER a quarter-century spent in and around steel mills, he has been made chief executive of a company manufacturing equipment for the mills.

ADVANCEMENT for him was always certain and rapid and he held many responsible positions before becoming associated with the company he now heads.

DURING his spare hours he says his work provides him with his greatest enjoyment and he professes to have no other hobbies.

SPENDING a quarter of a century working in and associated with steel mills, F. Hughes Moyer has been elected president of the Mackintosh-Hemphill Co., Pittsburgh, directing the manufacturing of equipment for such mills. All of his business career has been in the steel and related industries.

Mr. Moyer is a graduate of Cornell university, Ithaca, N. Y., obtaining a degree in mechanical engineering in 1899. Before his graduation he had obtained considerable valuable experience in foundry and machine shop work with the Springfield Architectural Iron Co., Springfield, O. Following the close of his college career, he became superintendent of the Springfield shop, serving for about a year. Later he went with the Wellman-Seaver-Morgan Co., Cleveland, where he worked on the design and construction of blast furnace and steelworks equipment.

In 1904 he entered the employ of the United States Steel Corp., in charge of the engineering department of the Carnegie Steel Co., under the direction of E. E. Slick, chief engineer. Later he held the office of chief engineer of the Clairton works, Carnegie Steel Co., and shortly thereafter he was made chief engineer of the Indiana Steel Co., Gary, Ind.

During the World war, Mr. Moyer became chief engineer of the Cambria Steel Co., Johnstown, Pa., where he was placed in charge of the entire wartime program of that company. About two years after the close of the war, he left the Cambria company to become assistant to the works manager of the Pittsburgh Crucible Steel Co., Midland, Pa. Three years later he was named chief engineer of the United Alloy Steel Corp., Canton, O. In 1925 Mr. Moyer was named assistant to the vice president in charge of operations and remained in this position until the year following.

Mr. Moyer left the Canton organizaton in 1926 to engage in consulting engineering work, remaining in that city. Included in his work was a survey of the Mackintosh-Hemphill Co. at Pittsburgh. Following this connection with the company, he was made vice presdent in October of that same year. He held that office exactly two years, being made president October, 1928.

He professes to have no hobbies, stating that his life has been so filled up with work that he has had no time to devote to amusements. He says he gets most of his enjoyment in his spare time out of his work. Mr. Moyer is a member of the Keystone Athletic club of Pittsburgh.

Men of the Industry

EDWIN S. CARMAN, secretary and chief engineer of the Osborn Mfg. Co., Cleveland, has resigned to establish Edwin S. Carman Inc., general and industrial engineer. Mr. Carman began work in the shop of the Sun Oil Co., Toledo, O., four years later entering the engineering field, going with the American Machine & Mfg. Co., Cleveland. This company was consolidated with the Johnston & Jennings Co.,

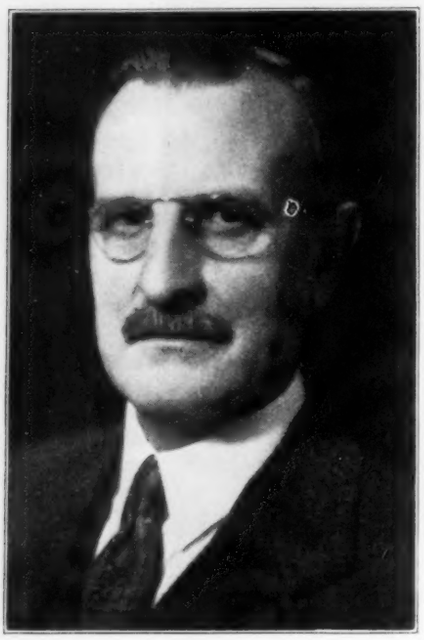


Photo by Blank-Stoller Inc.
E. S. CARMAN

also of Cleveland, and Mr. Carman was appointed chief engineer and manager of the engineering and machine department. Mr. Carman was engaged by the Osborn company in 1908 to design, manufacture and build up a line of foundry molding machines. He became directly associated with the Osborn company five years later, as chief engineer. In 1916 he was elected secretary and appointed works manager of the machine and brush divisions of the company. Mr. Carman has been prominent in the affairs of engineering societies and was formerly president of the Cleveland Engineering society.

* * *

C. R. Vance has become associated with the Welker Machinery Co. Inc., Detroit, as sales manager.

* * *

George W. Simmons, former president of the Simmons Hardware Co., and a vice president of the Chase National Bank of New York, has been elected president of the Huttig Sash & Door Co., St. Louis, succeeding E. L. McColm, retired.

* * *

A. J. Diefendorfer has been appointed assistant superintendent of the rolling mill department of the Farrell works, Carnegie Steel Co., Farrell, Pa.

* * *

Terry Hanlon, formerly with the Pennsylvania Wood & Iron Co., and Edward R. Jones, formerly with the Rochester Iron & Metal Co., will be in charge of the Buffalo office of the Hausman & Wimmer Co., Pittsburgh.

* * *

M. Berg, formerly connected with the Stearns Conveyor Co., Cleveland, and more recently assistant general manager of the Euclid Foundry Co., Euclid, O., has been made general manager of the Euclid organization, succeeding A. C. Denison.

* * *

Spencer S. Swasey has become associated with Walter A. Zelnicker Supply Co., St. Louis, as manager of the equipment department. Mr. Swasey was for 12 years with the Geo. D. Whitcomb Co., manufacturer of locomotives, the last six of which he was in charge of sales.

* * *

John N. Critchlow, Detroit representative of the Oliver Iron & Steel Corp., Pittsburgh, has been made general manager of sales, succeeding W. M. Heim, who has resigned. Prior to going with the Oliver corporation Mr. Critchlow was with the Pittsburgh Crucible Steel Co. at Midland, Pa., and before that with the Bethlehem Steel Co., Bethlehem, Pa.

* * *

Joseph W. Ivy, for 15 years manager of the Kansas City, Mo., office of the American Cast Iron Pipe Co., has resigned to become western sales manager of the National Cast Iron Pipe Co. with offices in the Land Bank building, Kansas City. Mr. Ivy is a well known authority on water and gas pipes, water works installation and pipe line work and has contributed several valuable scientific papers dealing with problems in his field.

* * *

Wilbur B. Topping, general sales manager of the Republic Iron & Steel Co., Youngstown, O., has resigned, effective Nov. 1. Mr. Topping, son of John H. Topping, chairman of the Republic company, is a graduate of the University of Pennsylvania and began working in the mills of the Republic company at Youngstown. He entered the sales department in Pittsburgh in 1911 where he remained for a year, going to the New York office from there. In 1912 he was stationed at Philadelphia, and four years later, moved to Cleveland. That same year he returned to the Youngstown office as assistant sales manager. He was

W. B. TOPPING

appointed general sales manager in January, 1919.

A. E. Walker, assistant sales manager of the Republic company, has been named to succeed Mr. Topping. Mr. Walker was formerly in charge of the pipe sales department.

* * *

A. C. Denison has been made president of the Fulton Foundry & Machine Co., Cleveland, succeeding A. E. Gibson, who has resigned. Mr. Denison was graduated with a degree in chemical engineering from Case School of Applied Science in 1910 and his first foundry connection was with the Ferro Machine & Foundry Co., Cleveland. Later he entered the employ of the Fulton Foundry & Machine Co., where for six years he was employed in various capacities involving mechanical operations and estimating. In 1921 Mr. Denison was made manager of the Euclid Foundry Co., Euclid, O., a position which he held until his resignation

recently to become president of the Fulton organization.

* * *

James A. Farrell, president of the United States Steel Corp., received the honorary degree of doctor of laws from St. Bonaventure college, Olean, N. Y., Oct. 4.

* * *

Walter G. Hildorf has been placed in charge of all metallurgical work for the Timken Steel & Tube Co., Canton, O., effective Oct. 1. For the past several years Mr. Hildorf has been metallurgical engineer for the Reo Motor Car Co., Lansing, Mich.

* * *

William H. Woodin Jr., son of the president of the American Car & Foundry Co. and the American Locomotive Co., has been appointed director of research of the car and foundry company. He will give special attention to the company's expansion into the motor bus and cruiser building field.

* * *

H. C. Weidner has been elected president of the Townsend Co., New Brighton, Pa. He previously was general manager, and has been with the Townsend organization for 15 years. Mr. Weidner has been active in the bolt, nut and rivet industry for 28 years. Before becoming general manager, he was for several years general sales manager.

* * *

C. D. O'Connor has been appointed master of river transportation and Capt. James A. Rankin assistant master of transportation for the Vesta Coal Co., subsidiary of the Jones & Laughlin Steel Corp. Mr. O'Connor formerly was superintendent of the Aliquippa & Southern railroad, while Captain Rankin has been with the Vesta fleet for more than 12 years.

* * *

N. L. Mortenson, connected with the Cutler-Hammer Mfg. Co., Milwaukee, for 21 years, has been appointed chief engineer. For the past five years he has been assistant to T. E. Barnum, present chief engineer who has been made consulting engineer for the company. Mr. Mortensen received his technical education in Denmark, the place of his birth, and is author of numreous papers. He is a fellow of the American Institute of Electrical Engineers.

M'Govern Wins Contract

New York, Oct. 9.—Patrick McGovern Inc., 50 East Forty-second street, has been awarded the general contract for constructing the proposed $42,000,000 water tunnel from Yonkers, N. Y., to South Brooklyn. The project will be 20 miles long and will require more than 21,000 tons of miscellaneous iron and steel.

Patrick McGovern Inc. was low on two sections and two other contractors low on two remaining sections. These latter had their money refunded.

Steel Founders Research Group Tells Story

How competing steel foundries have banded together in research to improve steel foundry practice is told in a pamphlet, "Competitors who have Co-operated to Improve Quality," which is being distributed by the Electric Steel Founders' Research bureau at the tenth national metal exposition at Philadelphia.

Of the small group which began pooling its technical interests in 1920, the survivors today are the Fort Pitt Steel Casting Co., McKeesport, Pa.; Lebanon Steel Foundry, Lebanon, Pa.; Michigan Steel Casting Co., Detroit; Nugent Steel Castings Co., Chicago; and Sivyer Steel Casting Co., Milwaukee. Maj. R. A. Bull is director and C. N. Ring assistant director, with headquarters at 541 Diversey parkway, Chicago.

Matters of finance, general policy and the like are determined by an executive committee, on which sit executives of the member companies. The technical committee consists of the works managers of the associated plants. Sales managers of the companies make up the merchandising committee, while research engineers stationed at the foundries constitute a subcommittee on research. Standards of inspection have been adopted.

In the pamphlet are described the founding of this group, its upbuilding, the various activities of its staff, A. S. T. M. specifications for steel castings, definitions of heat treatment terms and other valuable data.

Booklets Boost Steel in Construction

Four bookets of a series of eight have been issued by the American Institute of Steel Construction, New York. They cover mercantile, garage and theater buildings and bridges. The remaining four will treat the stadium, public apartment and school and hospital buildings.

The purpose of the booklets is to aid in inducing architects, engineers, owners and bankers to require and specify the use of steel. The booklets present the case for steel in the various types of buildings and are intended to start thought in a direction leading to the use of steel, thus aiding the salesman in his effort. They are pocket-size and typographically well done, easy to read.

River Traffic a Record

Pittsburgh, Oct. 9.—Traffic in iron and steel products over rivers in this district rose to a new high peak during August, according to figures just released from the United States engineers' office here. Comparative monthly figures follow:

1928	Allegheny	Monongahela	Ohio
August	50	109,738	124,066
July	.....	91,834	90,145
June	2,350	75,422	96,156
May	1,863	86,722	112,818
April	470	87,581	110,356
March	725	77,908	77,945
February	385	73,360	87,635
January	330	78,069	69,750
1927			
December	900	65,922	68,472
November	950	73,204	70,863
October	2,700	80,273	80,423
September	1,750	102,778	98,809
August	3,102	102,034	91,018
July	890	59,676	63,941
June	2,525	31,894	42,220
May	300	41,954	50,130
April	150	37,811	46,750
March	600	36,112	29,016
February	.....	29,529	29,211
January	.....	27,900	26,409

For the first eight months of this year, the Monongahela and Ohio rivers have seen the greatest movement of iron and steel products in history, the tonnage moved over the latter stream being more than double that of a year ago.

Receivers are Named

Eagan-Johnson Steel & Iron Co., Crum Lynne, Pa., has been placed in the hands of Daniel C. Eagan and the Pennsylvania Title & Trust Co., Chester, Pa., as co-receivers in a friendly action, on application of Bethlehem Steel Co., in United States district court. The company's business will be continued in operation by the receivers. Plans are being made to reorganize the company and carry on its business.

Obituaries

ARTHUR L. BETTS, 58, pioneer in oxyacetylene development, and secretary of the Davis Welding & Mfg. Co., Cincinnati, died Oct. 2. He was the inventor of numerous appliances for the industry.

* * *

Abram James, 74, proprietor of the Pioneer Foundry, LaCross, Wis., established in 1856, died Sept. 30. He was born in England and came to America in 1869, joining his father and brothers in LaCross in 1874. After their death Mr. James became the sole owner of the foundry business.

Safety Congress Covers Wide Field in Annual Meeting

TAXING the facilities of the five hotels in which its 110 meetings were held, the seventeenth annual Safety Congress last week in New York passed all previous records. From many points of view it was an epoch-making event. Not only were the sessions well attended, but the discussion was interesting and full of sound practical material. Altogether more than 300 papers were presented. One of these on flying personnel was presented by Colonel Charles A. Lindbergh, and police were required to keep the crowd in check.

The importance of the work of the National Safety Council was described in the annual address of the president, Homer E. Niesz, manager industrial relations, Commonwealth Edison Co., Chicago. He declared that nearly 9000 lives would have been saved during the past year had all industrial establishments in the country been as successful in their safety work as the 2000 establishments represented in the safety council membership. In reviewing the activity of the past year, he described the magazine, *The Safe Worker*, which now has a circulation of 125,000 copies each month. He told of the different medals which had been offered for safety work during the past year, and outlined the model city traffic ordinance which has been completed by a committee appointed by former Secretary Hoover.

Henry A. Reninger, special representative, Lehigh Portland Cement Co., Allentown, Pa., was elected president to succeed Mr. Niesz, at the Wednesday business session, at which time directors and other officers were elected. The various sections also elected their officers for the next year during the congress. E. G. Quesnel of the Commonwealth Steel Co., Granite City, Ill., was elected chairman of the metals section.

As part of the convention, an exhibit of safety devices and products identified with safety work was held. This occupied the entire top floor of the Pennsylvania hotel, and included an exhibit of various types of clothing, goggles for use in foundries and metal working establishments, fire extinguishing apparatus, many kinds of machine guards, safe types of electrical apparatus and equipment for first aid and resuscitation.

Many plant inspection trips were made. Metal section delegates visited the aluminum sheet rolling mill of the United States Aluminum Co., Edgewater, N. J., and the plant of American Abrasive Metals Co., Newark, N. J. The power press section delegates visited the plant of the E. W. Bliss Co. at Brooklyn and the construction section delegates inspected the work of the new Hudson River bridge, which now is in progress and which when completed will have twice the span of any suspension bridge in existence. A special train took delegates through the Interborough Rapid Transit system for inspection of its many safety devices and automatic interlocking features.

The registration at the congress ran close to 3000, but it was estimated by those familiar with these conventions that the total attendance exceeded 7000.

See Shop Foreman Responsible for Accidents

THE shop foreman is responsible for accidents. This was clearly demonstrated at a distinctive session of the metals division at the seventeenth annual safety congress held in New York last week. At this session, a miniature theatrical was staged by two safety enthusiasts, J. A. Voss, director of safety and compensation, Central Alloy Steel Co., Massillon, O., and Michael P. Grady, foreman, Pennsylvania railroad shops, Stanton, O. The method of presentation was something entirely new to the hundreds of seasoned convention delegates who packed the hall to overflowing. Mr. Voss took the part of the safety engineer in a large machine shop, while Mr. Grady took the part of a hard boiled foreman. The dialogue between the two covered a period of three or four months of the plant's operation, during which period the safety engineer gradually broke down the resistance of the foreman, and built up a modern, efficient safety program in his shop. The scene shifted from the shop to the foreman's office, the stage property being designated by large signs. Signs were also used to denote the passage of time between the visits of the safety engineer.

The dialogue was opened in the machine shop where the safety engineer encountered the foreman engaged in severely calling down the crane operator. The safety man asked the foreman if he could stop awhile and go into some safety plans, pointing out that the foreman's department was at the bottom of the list with more accidents than any other department. The foreman said he was too busy because he was shorthanded. "The assistant foreman is out with a piece of emery in his eye."

The safety man asked whether the assistant had goggles. The foreman said, "Sure they were in his pocket."

"Why don't you see to it that your men wear their goggles?" asked the safety engineer.

"Because the goggles don't fit," replied the foreman. "You safety people sent down one size of goggles for the whole darn crew," continued the foreman "and the man whose eyes are far apart or near together is out of luck. He usually keeps the goggles in his pocket."

The dialogue continued along this general line until nearly all of the usual complaints of foremen were brought up and answered. At one point the safety engineer had the foreman call in his gang to give them a little talk. The audience then became the gang. Half a dozen or more men in the audience were prepared to take the roles of machine operators.

Some of the points brought out by the dialogue are that the company should have a fund for the purchase of guards and other safety equipment so that such purchase would not penalize the individual department,

and that special form cards should be distributed among the men asking them to fill in different jobs which seem to them to be dangerous and to tell why they are dangerous and, if possible, suggest a remedy.

Foundries Lag in Safety Work

The situation in small foundries throughout the country is disappointing from a safety point of view, according to Dr. L. W. Chaney, bureau of labor statistics, Washington, in a paper before the metals section. The big question before the metals session, he said, is how to reach the small foundry plant with a comprehensive safety program. In many of these plants, accidents are relatively infrequent, but nevertheless on a basis of man hours of exposure they are higher than in any other branch of industry.

Taking foundries as a whole, Dr. Chaney finds that the frequency of accidents has not declined at all over a period of 15 years. This in view of the marked decline in frequency of accident in other industries is a startling revelation. The severity of accidents among foundries has decreased, however.

F. G. Bennett, Buckeye Steel Castings Co., Columbus, O., in discussing Dr. Chaney's paper said that he felt that this was the most important single line of activity for the metals session to take up during the coming year. He therefore moved and it was voted that a special committee on foundries be appointed by the executive committee of the metals session to investigate the situation and to devote its energies during the coming year to the solution of this serious problem. Mr. Spengle, National Tube Co., Ellwood City, Pa., said that one difficulty with the foundry industry is the small number of representatives of small foundries in the National Safety council.

Considerable discussion centered around the point of insurance rates for foundries producing small work as compared with foundries producing large work. Rates for both classes of foundries are the same in Pennsylvania, and in some other states. Several speakers urged a lower rate for the foundries turning out light work, and an insurance representative present said he thought this was a fair request.

Dr. Chaney in replying to questions, after his paper had been read, gave many interesting phases of the work of the bureau of labor statistics. He said that the decline in the severity of accidents is not as rapid as the decline in frequency. He also pointed out that the rate of decline of accidents becomes less and less as time goes on for any specified plant. If a plant is bad enough at the start, it will be easy to make a heavy rate in decline of accidents soon after the installation of a safety program. But naturally as the accidents decline the rate of declining diminishes.

The most important single item, in the opinion of Dr. Chaney, in the reduction of severity of accidents in industrial plants is the actual condition of the plant itself. If a plant has been modernized, is shipshape, clean and systematic; if it is well organized, each man knowing his job and doing it, then the number of accidents is always low.

New Officers

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Lehigh Portland Cement Co., Allentown, Pa.

Vice Presidents

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General Electric Co., Schenectady, N. Y.

CHARLES E. HILL
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GEORGE OPP
New York Central Lines, New York.

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Erskine bureau, Harvard university, Cambridge, Mass.

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Yale Medical School, New Haven, Conn.

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C. L. Close, manager, bureau of safety and sanitation—United States Steel Co., New York.
J. B. Douglas, manager, insurance department, United Gas Equipment Co., Philadelphia.
F. W. Fisher, manager employment and claim department, Rochester Gas & Electric Corp., Rochester, N. Y.
Isaiah Hale, Atchison, Topeka & Santa Fe Railroad, Topeka, Kans.
Charles E. Hill, general safety agent, New York Central Lines, New York.
Dana E. Jones, secretary, Manufacturers Association of Erie, Erie, Pa.
T. H. McKenney, superintendent labor and safety, Illinois Steel Co., South Chicago.
Homer E. Niesz, manager industrial relations, Commonwealth Edison Co., Chicago.
Law R. Palmer, engineer, Equitable Life Assurance Society, New York.
W. E. Pettibone, works manager, Willard Storage Battery Co., Cleveland.
G. E. Sanford, General Electric Co., Schenectady, N. Y.
David Van Schaack, director bureau of inspection and accident prevention, Aetna Life Insurance Co. Hartford, Conn.
J. M. Woltz, safety director, Youngstown Sheet & Tube Co., Youngstown, O.

Beginning Habit of Safety

Safety is fundamentally a psychological matter said Dr. A. W. Colcord, plant surgeon, Carnegie Steel Co., Clairton, Pa., in his talk before the metals section, Wednesday morning. The man in the mill must learn to be himself. He must not be constantly conscious of danger. The state of mind which he must acquire on his job must be similar to that acquired by the experienced automobile driver who goes through heavy traffic without any thought of danger, and in many cases, as a matter of habit. Experience has shown that well formed habits are excellent safety factors.

Makes Three Groups

Dr. Colcord divides accidents into three groups: Those which are apparently beyond the control of man, such as earthquakes or lightening; those where the fault is with others, such as earthquakes or lightning; equipment, and those accidents which are caused by the operator's own carelessness or laxness. Accident prevention work may be directed toward all three of these groups. That is, a building may be made fireproof to reduce the hazard of lightning; equipment may be carefully inspected to avoid failure and under group three the man himself may be inspected.

A surprisingly large number of railway accidents have been caused by some form of brain disease of the engineer. This usually is syphilis of the brain which causes an acute condition without warning. The presence of the disease could have been determined, however, by tests, according to Dr. Colcord. Most accidents in industry if analyzed will show some underlying health cause. These may be as vague as poor ventilation, or worry at home, but they nevertheless come under the classification of faulty health conditions.

When habits have been well established, new situations arising may cause accidents. Therefore the introduction of new methods and new processes, or the rearrangement of tools, or other equipment should be accompanied with unusual vigilence on the part of the safety committee members. The general advice offered by the speaker is to keep men away from hazards as much as possible, and keep the human machine in repair, and this latter is best done by frequent physical examination. Some plants examine all employes for tuberculosis and syphilis at regular intervals, usually once a year. Good health must be sold to the employe. He must be made to want it. Dr. Colcord warned against paternalism in the medical department. He said he thought it was wrong to supply free dental work, however, much that might be needed. The medical department should, however, follow up cases where dental work is required and see that the employe has it done, loaning him the money or giving him financial as-

sistance wherever it is necessary.

Operators on special jobs should have special examinations. The operators of a crane in a large machine shop, for instance, should show a better eyesight test than a operator with less responsibility.

Putting Injured Back on Job

Under the heading of occupational therapy, Dr. Colcord advised putting men back to work as soon as possible, giving them light work or work suitable to their condition. In a large plant this is usually possible through the co-operation of superintendents. Dr. Colcord said that in his own plant he has excellent co-operation with 40 superintendents and that it is almost always possible to find work for a man just as soon as he was able to be up and around after illness or accident.

The paper promoted lively discussion. One of the points covered was the question of reward. A paper by L. A. Hartley, director, educational department, National Founders' association, Chicago, which was read in the author's absence by F. G. Bennett, advised against rewards unless carefully and unostentatiously presented. Some speakers told of good results through rewards, but all agreed that they should be properly given. Dr. Colcord in replying to this discussion, said that he felt rewards should be made on a group basis, rather than to the individual. James Teague, National Cash Register Co., Dayton, O., said that in his experience laziness is almost always directly traceable to health. He explained his company has a rule to send all cases of laziness direct to the medical department before trying to correct the situation in the shop. Such cases are examined for all causes, such as home conditions and financial worry, in addition to the regular physical examination.

E. C. King of the Wickwire-Spencer Steel Co., Worcester, Mass., told of work of rehabilitation in his plant. He said that men injured so that they can not be used at their regular work are given an apprentice course or even educational schooling to fit them for some other work. Charles E. Deaner, Union Drawn Steel Co., Beaver Falls, Pa., declared that where a man is injured at one particular job and readapted to another job at a lower rate, he sometimes is given compensation for the difference in pay between the two jobs. Mr. Morrey, general manager of the Commonwealth Steel Co., St. Louis, said that long experience has shown that the first carelessness of any given character as a rule does not result in an accident and therefore, by prompt attention to all carelessness even of a minor character steps usually can be taken to avoid its return and thus to avoid accidents.

Mr. Hartley's paper emphasized the importance of physical fitness and interest in the work on the part of the employe. To this end, the foreman should be given a share in the personnel work. If a man is in trouble, or financial assistance is needed, the help offered should be routed through his foreman.

The management must take an exceedingly broad view of safety work, according to Mr. Hartley. Lack of proper nutrition may deplete the supply of blood to the brain, and result in poor eyesight and consequent accidents. Fainting, he said, usually is the result of a pale brain, that is, a brain with insufficient blood. Sometimes too heavy physical exertion will cause this. Many of the factors contributing to physical conditions are complementary or interlocking. Thus a man who is cold will be more susceptible to shock whereas, a man who has been shocked or disturbed mentally will be more susceptible to coldness. Wherever the employe's normal activity is stimulated through some external source such as fear, there is an inevitable reaction below the normal after this stimulus has been removed. It is this fact that makes individual reward of doubtful value, according to the author of the paper.

Profits Small, Earnings Made on Volume

Narrow profit margins in competitive industry and trade have come to stay because they are an inevitable characteristic of the trend toward large-scale enterprise and mass production which has grown out of technological progress and the mechanization of industry. This in the conclusion of the National Industrial Conference board, New York, based on an analysis of profit ratios to sales and capital investment of more than 4000 large and successful industrial, mercantile and other corporations from 1918 to 1925.

The results of the study emphasize not only the hazard incurred today by all competitive business, but also the potential profitableness of efficient large-scale production. Sales at prices closely approximating cost of production are the dominant factor in determining commodity prices, forcing producers and merchants to seek profit by volume rather than by individual sale. Approximately half the sales of the large and successful corporations selected for analysis annually were made at less than 5 per cent profit in most of the manufacturing industries. In trade, particularly the wholesale trade, more than half of the sales were made at a profit of less than 5 per cent or at a loss. The average amount of sales at low profit rates or at a loss for all corporations is estimated to be even greater.

This condition, however, the board points out, does not necessarily result in a low return on capital invested, but rather tends to accelerate turnover and thus may result in high returns. The following illustrates approximately the various rates of profit or loss realized on sales by all corporations on the basis of the study:

Per cent of total sales	Per cent loss
5	0.0 to 2.4
3	2.5 to 4.9
7	5.0 or more

Per cent of totals sales	Per cent profit
5	20.0 or more
2	17.5 to 19.9
4	15.0 to 17.4
6	12.5 to 14.9
8	10.0 to 12.4
10	7.5 to 9.9
12	5.0 to 7.4
16	2.5 to 4.9
22	0.0 to 2.4

Will Use Much Copper

New long distance facilities planned by the American Telephone & Telegraph Co., at a cost of $11,042,000, will require large quantities of material. The construction program will involve 4,513,000,000 conductor feet of copper wire in cables, 22,282,000 pounds of copper and 383,880,000 conductor feet in open wire lines, 21,994,000 pounds of copper.

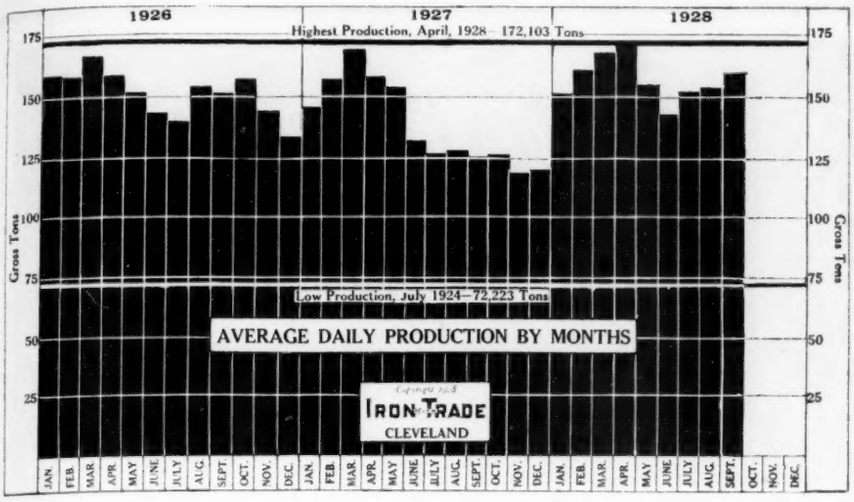
Cable sheaths will require 39,283,000 pounds of lead and 413,000 pounds of antimony. Conductor insulation will require 4,126,000 pounds of paper.

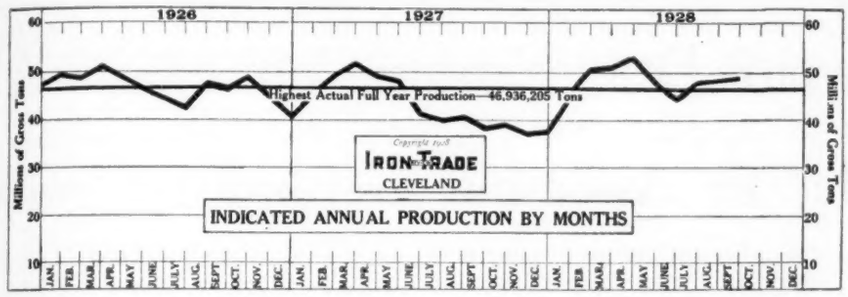
The improvements include extensions and additions to lines in all parts of the country and to the three transcontinental routes. These will provide new carrier current circuits, radio program transmission lines and private wire facilities.

Drawbacks Are Allowed

Washington, Oct. 9.—The treasury department has announced allowance of drawback on aluminum castings manufactured by the Bohn Aluminum & Brass Corp., Detroit, with the use of imported aluminum.

The department has also announced drawback allowance on aluminum castings, rough or finished, manufactured by the Hoover company, North Canton, O., with the use of imported aluminum.





Ingot Output at New Height

WHILE a new high record in steel ingot production for September was established last month, the total 4,147,583 tons was a trifle below the August output of 4,178,481 tons. Because August had two more working days the performance in September was really better than August. The daily average in August was 154,759 tons as compared with 165,903 tons, the daily average output in September.

According to statistics compiled by the American Iron and Steel institute, the output (calculated) of open-hearth and bessemer ingots for the first nine months this year aggregated 36,930,520 tons and compares with a total of 33,778,952 tons for the same period a year ago, an increase of 3,151,568 tons so that to date the country is approximately one small month's output ahead of 1927. If the September average daily output of 165,903 tons had been and could be kept up all year, for 311 working days, the aggregate for the year would be approximately 51,500,000 tons. On the basis, however, of maintaining the average monthly output to date of 4,103,391 tons for the remainder of the year a total of 49,240,693 tons is indicated.

The September total this year, 4,147,583 tons compares with 3,268,881 tons for September a year ago, and September this year had one less working day. The totals for the month of September in 1922, 1923, 1924, 1925 and 1926 were 2,818,261; 3,356,776; 2,827,625; 3,489,565 and 3,913,383 tons, respectively. In September, 1926, electric and crucible ingots were included whereas the figures for September, 1928, include only bessemer and open hearth.

September, 1928, operations were on the basis of 88.01 per cent of capacity as against 68.32 per cent a year ago. For nine months the steel industry has averaged 84.08 per cent of capacity this year as against 78.78 per cent for the first nine months of 1927. April of this year saw the peak, when the average was 91.29. March ran a close second at 88.56 per cent of capacity.

Steel Ingot Production—1927-1928

94.68 Per Cent of Industry Reporting

Gross Tons

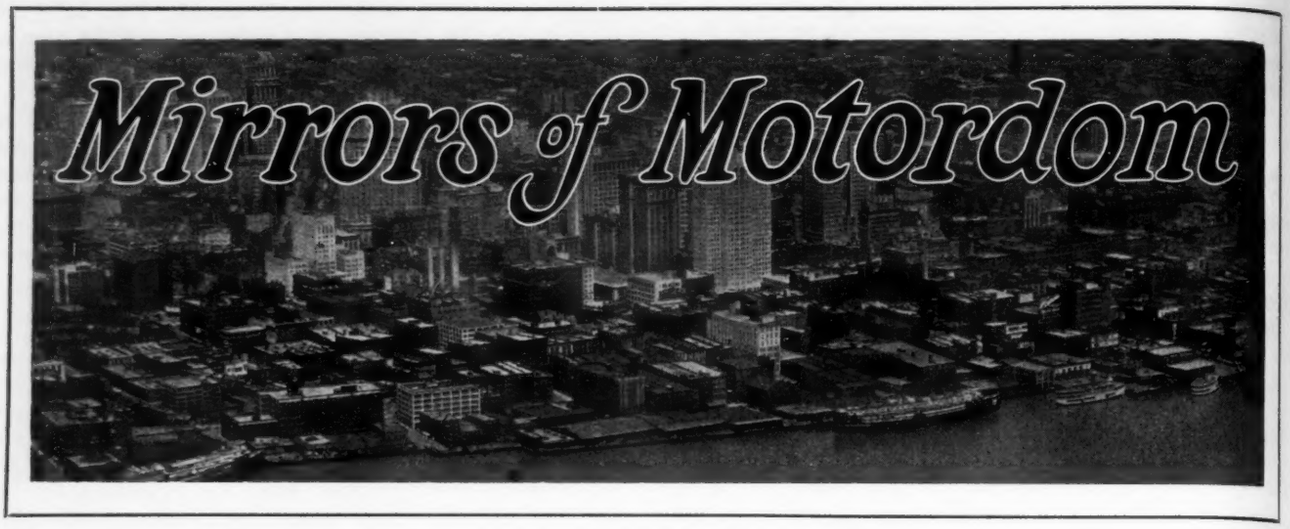
1927	Open-hearth	Bessemer	Monthly output companies reporting	Calculated monthly output all companies	Number of working days	Approximate daily output all companies	Per cent of operation
Jan.	3,042,133	545,596	3,587,729	3,789,874	26	145,764	79.21
Feb.	3,043,492	565,226	3,608,718	3,812,046	24	158,835	86.31
March	3,702,660	590,709	4,293,369	4,535,272	27	167,973	91.28
April	3,341,750	565,440	3,907,190	4,127,335	26	158,744	86.26
May	3,273,593	557,785	3,831,378	4,047,251	26	155,663	84.59
June	2,823,107	486,053	3,309,160	3,495,609	26	134,446	73.06
July	2,596,349	436,883	3,033,232	3,204,135	25	128,165	69.65
Aug.	2,806,347	505,596	3,311,943	3,498,549	27	129,576	70.41
Sept.	2,622,977	471,548	3,094,525	3,268,881	26	125,726	68.32
Total 9 mos.	27,252,408	4,724,836	31,977,244	33,778,952	233	144,974	78.78
Sept.	2,622,977	471,548	3,094,525	3,268,881	26	125,726	68.32
Oct.	2,643,562	495,845	3,139,407	3,316,292	26	127,550	69.31
Nov.	2,478,627	481,599	2,960,226	3,127,015	26	120,270	65.36
Dec.	2,557,955	448,154	3,006,109	3,175,484	26	122,134	66.37
Total	34,932,552	6,150,434	41,082,986	43,397,743	311	139,543	75.83
1928							
Jan.	3,280,247	498,746	3,778,993	3,991,332	26	153,513	81.43
Feb.	3,308,728	521,366	3,830,094	4,045,304	25	161,812	85.84
March	3,700,411	567,309	4,267,720	4,507,520	27	166,945	88.56
April	3,509,637	564,039	4,073,676	4,302,573	25	172,103	91.29
May	3,397,631	581,949	3,979,580	4,203,190	27	155,674	82.58
June	3,016,487	527,351	3,543,838	3,742,964	26	143,960	76.37
July	3,075,247	533,550	3,608,797	3,811,573	25	152,463	80.88
Aug.	3,386,750	569,436	3,956,186	4,178,481	27	154,759	82.09
Sept.	3,381,917	4,545,015	3,926,932	4,147,583	25	165,903	88.01
Total 9 mos.	30,057,055	4,908,761	34,965,816	36,930,520	233	158,500	84.08

Figures exclude crucible and electric ingots. Operation percentages for 1927 are based on an annual open-hearth and bessemer steel ingot capacity of 57,230,350 tons, as of Dec. 31, 1926; for 1928, on 58,627,910 gross tons as of Dec. 31, 1927.

Briggs Heads Scrap Men

John R. Briggs, of Henry Potts & Co., Philadelphia, has been elected chairman of the Philadelphia chapter of the Institute of Scrap Iron and Steel. Other officers elected include Harry A. Kirshman, of the Allegheny Iron & Metal Co., Philadelphia, vice chairman; J. B. Partridge Jr., of Allen R. Hoffer Co., Philadelphia, secretary; and R. M. Marshall, of Marshall Iron & Metal Co., Philadelphia, treasurer.

The W. S. Tyler Co., Cleveland, is producing a copper wire bolting cloth for use in flour mills as a substitute for the usual cotton cloth used for the sifting and grading of flour.



Auto Industry Avoids Dead Center; Consumes Steel Steadily; Chevrolet to Assemble in Bombay, India

* * * * * * * * *

Detroit, Oct. 9

WHERE are the weeks of yesteryear when came a paucity of orders or practically a cessation of steel specifications from the automotive industry, pending the debut of new models? Are the automobile makers so organized or their operations so synchronized in the merchandizing of their product that they avoid such valleys? It would seem to be the case if 1928 is a criterion. Whereas in former years, sellers of sheets, strips, cold finished bars, etc., would reach a stage when practically no shipping instructions would be forthcoming from this important consuming line, this year proved an exception. The July-August period was one of almost unprecedented activity.

The General Motors Corp. delivered 4.17 cars per minute throughout August, represented by its total of 187,463 units. Similar accomplishment was registered in September. The aggregate of all cars and trucks was 458,429 in August and at least a 400,000 total is the figure for September, not yet officially announced. The year promises to exceed the record-breaking output of 1926 when 4,503,529 units were produced. Since 3,201,234 cars and trucks represented the aggregate output for nine months this year, an average of only 435,000 will have to be maintained throughout the final quarter to outdistance 1926.

The great question before the steel industry is—will it, in the final lap, suffer for the abnormal activity of the third quarter? The general answer is, "No." The auto industry is in high gear. Ford is hitting his stride of more than 5000 cars daily and planning to reach 10,000 daily by Jan. 1, 1929. With more than 400,000 Model A cars out, he has accumulated orders for 750,000 to 1,000,000. Other producers are maintaining their August-September daily rates: Chrysler-Plymouth, 1700; Graham-Paige, 200; Hudson, 300; Essex, 900; Hupmobile, 225; Cadillac, 100; La Salle, 125; Dodge, 700; Reo, 160; Oldsmobile, 300; Oakland, 600; Packard, 175; Studebaker, 400; and Chevrolet, which lately has been running neck and neck with Ford, at 5000 or more, having held the lead in the race for about two years, plans a daily output of 6000.

* * *

NEW models are about to make their bow in several instances. The Oakland will soon appear and be entirely different from previous machines of that make. No information is as yet available on the new Pontiac. Prejudicial statements against the new Buick are diminishing, the best proof of which is found in its schedule of 1200-1300 daily and the fact that even Detroit dealers cannot obtain enough cars to supply the demand. Hence reports of a newer Buick are denied. Last Saturday, Chevrolet's production schedules practically ceased. The program there now is one of cleaning up on the 4-cylinder model, clearing the decks for the new 6-cylinder scheduled some say to appear Oct. 16 and others at the January shows. An initial output of 6000 cars daily is being arranged. This car will sell at the present Ford price or slightly ahead of it. Upkeep, repairs and replacements it is claimed, will be as cheap on the six as on the present four.

* * *

MORE and more attention is being paid by automobile manufacturers to the export market. This month, the General Motors Corp. starts a Chevrolet assembly plant in Bombay, India, where the present 4-cylinder car sells for slightly less than $1000. The new Ford has lost ground in that territory, not meeting the requirements as did the old model T, and the Chevrolet has had an ascendency. W. C. Durant has recently been in Berlin, supervising the opening of a manufacturing plant. In one week recently he spent more than $25,000 in telephone calls, keeping in touch with business interests. This truly is a far cry from the days when he was a young grocery clerk at Flint, Mich. Shipments are increasing to Finland. Of the 20,677 passenger cars in that country, 18,653 are of American make and 6768 of the 7437 trucks imported from here.

* * *

AFTER 22 consecutive weekly gains in employment in Detroit, culminating in a total of 300,759 for the week ended Sept. 18, the week ended Sept. 25 registered a drop of 3186 to 297,573. Over one-third of the number are reported employed by Henry Ford. The decline is negligible, however, being less than 1 per cent. This compares with the previous peak registered in 1926 when 274,399 were employed.

Here and There in Industry

Timely Information Which Records Developments in Various Lines of Productive Enterprise

UNION CHAIN & MFG. CO., Sandusky, O., has acquired control of the American High Speed Chain Co., Indianapolis, and will combine the two companies, subject to approval of stockholders of the latter. The Union Chain & Mfg. Co., established in 1913, builds elevating and conveying machinery and manufactures steel sprocket chain. The American company, established in 1916, manufactures silent or high speed chains and smaller pitch steel roller chain and sprockets, for power transmission. As soon as the merger is completed, the entire production will be concentrated at Sandusky. J. C. Howe, president, and W. A. McCosh, vice president, of the American company, will move to Sandusky and become part of the new organization. Fred Emmons will become president and treasurer, J. C. Howe and Walter Hay, vice presidents, and E. F. Emmons, secretary.

* * *

VANADIUM CORP. OF AMERICA, 120 Broadway, New York, has opened an office at 2245 Oliver building, Pittsburgh, in charge of J. Alfred Miller Jr., general manager of sales.

* * *

READING CASTING CO. has moved its plant and offices from Reading to Monocacy, Pa. Enlarged facilities are available in the new plant.

* * *

NATIONAL AUTOMATIC TOOL CO., Richmond, Ind., has bought a 4-story brick building to be used as a warehouse. The company manufactures multiple drills.

* * *

INGERSOLL-RAND CO., New York, has received an order for three 300-horsepower oil electric locomotives from Donner Steel Co. Buffalo, to replace all of this company's standard gage steam locomotives.

* * *

HARDIE-TYNE MFG. CO., Birmingham, Ala., has been given an order by the navy department for a 6000-cubic foot capacity cross compound, corliss steam-driven, two-stage air compressor for installation at the navy yard at Portsmouth, N. H. A similar compressor has just been completed for installation in a limestone quarry of the Tennessee Coal, Iron & Railroad Co., at Birmingham. The latter is electrically driven.

* * *

NIELSEN MACHINE CO., Racine, Wis., has come into the control of C. C. Neilsen and Axel O. Neilsen, who will continue the business. John C. Burkell has disposed of his interest to these two.

* * *

NASH MOTORS CO., Kenosha, Wis., has let a contract to the Wisconsin Bridge & Iron Co., Milwaukee, for a second story, 20 x 780 feet and 40 x 118 feet, L-shaped, for its foundry at Kenosha.

* * *

WESTFIELD NUT CO. INC. has plans for plant addition. This company manufactures nuts for automobiles, and ships virtually its entire product to Detroit. It is now manufacturing at the rate of 5,000,000 a month with 60 days orders on its books.

* * *

UNITED STATES CAST IRON PIPE & FOUNDRY CO. is enlarging its facilities for production of centrifugal pipe at its plant at North Birmingham, Ala. A unit is being added for the production of pipe 4 to 12 inches in diameter and 18 feet long. Quantity production previously has been limited to 12-foot lengths, 4⅞ inches in diameter.

* * *

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE RAILROAD, Fifth and Marquette avenues, Minneapolis, is having preliminary surveys made for extensive improvements in its division headquarters at Ashland, Wis. This includes enlargement and remodeling of the roundhouse, machine shop, storeroom, coaling plant, cinder pit and water tank.

* * *

DEBEVOISE-ANDERSON CO. INC., which recently moved its offices from 114 to 117 Liberty street, New York, has been appointed agent of the Philadelphia Coke Co. for sale of its by-product coke for foundry and general metallurgical purposes. Sale will be handled largely by the company's branch in the Stephen Girard building, Philadelphia. Debevoise-Anderson Co. Inc. has opened a branch office at 902 Chapel street, New Haven, Conn., from which it will sell by-product coke manufactured by the Connecticut Coke Co., New Haven.

* * *

MARCHETTI MOTOR PATENTS INC., San Francisco, has bought 100 acres and will build a plant for the manufacture of aeronautic, marine and industrial motors and airplanes. Capacity of 1000 motors and 100 all-metal monoplanes each year is planned. The plant will be of unit construction, eight buildings 40 x 300 feet, connected by overhead trolley system, 50 feet space between buildings. The buildings will be one story in height, of steel, with ample window space and connected by covered distributor aisleways. Tools will be individually motor driven.

* * *

HIGHWAY TRAILER CO., Edgerton, Wis., has leased three buildings of the Moline Wagon Co. group at Stoughton, Wis. They are being remodeled and equipped for the manufacture of steel dump and other bodies for trailers and special body equipment for motor trucks and trailers. The lease includes the blacksmith shop, spreader shop and steel warehouse of the old plant, including considerable woodworking equipment. Metalworking equipment will be provided by purchase and by removal from the shops at Edgerton. James W. Menhall is president and Andrew McIntosh vice president and treasurer.

* * *

NORDBERG MFG. CO., manufacturer of mine hoists, diesel engines, uniflow engines, air and gas compressors, has bought the crusher business of the Symons Bros. Co., Chicago, and will consolidate it with its own plant at Milwaukee. The Nordberg company has been building about two-thirds of the crushing machinery sold by the Symons company. The latter sells its patents, crusher business and goodwill. The Symons engineering, sales and executive forces are joining the Nordberg organization, which continues under its present management with Robert E. Friend as president. Additional stock will be issued by the Nordberg company,

which will provide for additions to its plants at Chicago and Milwaukee.

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WELKER MACHINERY CO. INC. is the new name adopted by the E. H. Welker Co., Detroit, its new location being 650 Beaubein street.

* * *

O-G ERIE & STAMPING CO., Fostoria, O., manufacturer of dies, tools, jigs, fixtures, special machinery and sheet metal stampings, is bringing out a new type facing machine for facing castings and bushings.

* * *

DONNER STEEL CO., Buffalo, has ordered three additional 300-horsepower oil-electric locomotives to be built jointly by the Ingersoll-Rand Co., the General Electric Co. and the American Locomotive Co. The Donner company already has one locomotive of this type in operation.

* * *

REFINED STEEL CO., Pittsburgh, entertained a group of about 25 engineers and representatives of railroads and industries, Oct. 4, at a test on a steel axle treated by a process developed by the company. The test was at the plant of the Pittsburgh Forge & Iron Co.

A treated steel axle, 6¾ inches in diameter, required 83 blows of a 2240-pound weight dropped from a height of 41½ feet to break it. An untreated specimen of the same diameter failed after 70 blows, although railroad men stated that most axles fail after 50 such impacts.

The Refined Steel Co. was organized a short time ago to promote this new process of refining steel, which has been in the experimental stage for a number of years and which is claimed to produce material of cleaner and more uniform structure than ordinary carbon steel. An increase in tensile strength and ductility consequently has been obtained, according to the company. Officers of the Refined Steel Co. are: President, B. F. Hardesty; vice president, L. B. Cook; and secretary-treasurer, T. G. Davis.

New Lock Nearly Ready

Pittsburgh, Oct. 9.—Lock and dam No. 6, Allegheny river, is expected to be opened to navigation Oct. 15, according to Maj. Jarvis J. Bain, Pittsburgh district engineer. The gates, manufactured by Heyl & Patterson, now are being loaded on barges and will be placed in position next week. Completion of this lock and dam will permit slackwater navigation to Kittanning, 46 miles. The lock is of regulation size, 56 feet wide and 360 feet long, while the dam, one of the longest on that stream, is 1140 feet long. The lock was built by the John F. Casey Co., and the dam by the Dravo Contracting Co., both Pittsburgh, and completed in 18 months. It was stated that it is expected work will start on Lock No. 7 at Kittanning before the end of the year.

Cost Knowledge Needed in Concrete Steel

(*Concluded from Page* 921)

ger said, "Train your own men. Do not increase the individual's wage beyond his earning power, by bidding for his services from your direct competitors. Your own trained men are more loyal and more capable of concentration on your policies. The only handicap, greater than incompetence, that a man can have, is to be overpaid."

In a symposium on, "Unusual Construction Jobs," Louis Metz, Concrete Engineering Co., Omaha, Nebr., described several projects which had been redesigned from wood to reinforced concrete. W. J. Holliday of Indianapolis gave details of the use of steel frames and reinforced concrete first floors in residences in Indianapolis. A. E. Lindau, American System of Reinforcing, Chicago, concluded the symposium with an illustrated talk on erecting tall buildings.

The concluding session, the morning of Oct. 3, was devoted to concrete ribbed floor construction. Form manufacturers and dealers asked that a special committee be appointed to work out plans for a special department in the institute for that phase of the industry. The meeting then was turned over to P. H. H. Dunn of the division of simplified practice, department of commerce.

After an extended discussion, a new recommendation of standard sizes was approved, subject to the usual referendum of the department of commerce. These sizes were as follows:

All Dimensions in Inches

Width of Standard Forms	*Depths of all Forms
20	6, 8, 10, 12, 14
30	6, 8, 10, 12, 14

Widths of Special Filler Forms**
10 and 15
or
12 and 16

*Depth is interpreted to mean the vertical distance from the under side of the concrete slab above the center of the form to the bottom of the concrete joist.

**To be used as Specials for fillers only.

The fifth annual meeting of the institute will be held in March, 1929.

Ohio Valley Improvement Progress Reviewed

Pittsburgh, Oct. 9.—Representatives of iron and steel companies participated in the thirty-fourth annual convention of the Ohio Valley Improvement association in this city, Oct. 3-4. About 400 delegates attended, and heard reports of progress in the development of river transportation. A luncheon was tendered to the guests by the Jones & Laughlin Steel Corp., and visits were made to the plants of the Carnegie Steel Co., and other manufacturers. Officers were re-elected.

Addresses were made at the opening session by Col. Harley B. Ferguson, division engineer in charge of Ohio river improvement and the district engineers, and Norman F. Titus, chief, transportation division, department of commerce. A business session was addressed by the following: Jeff Williams, president, Green River Improvement association, Evansville, Ind.; Lachlan Macleay, secretary, Mississippi Valley association, St. Louis; George A. Cooper, executive secretary, Parkersburg board of commerce, Little Kanawha river improvement; S. A. Thompson, secretary, National Rivers and Harbors congress and Edgar Jadwin, major general, chief of engineers, war department.

Speakers at the Wednesday afternoon session included Walter F. Schulz, consulting engineer of Memphis, Tenn., who discussed "Terminals"; William B. Rodgers, president of the Rodgers Sand Co., Pittsburgh, who spoke on "European Waterways" and D. M. Hoover, supervising inspector general, steamboat inspection service, Washington, whose subject was "Steamboat Inspection."

Principal speakers at the annual banquet included William T. Mossman, Jones & Laughlin Steel Corp.; Maj. Gen. Edgar Jadwin, chief of engineers, war department; Maj. Gen. T. Q. Ashburn, chairman, Inland Waterways Corp.; Riley J. Wilson, president, national rivers and harbors congress, and George H. Campbell, assistant to the president, Baltimore & Ohio railroad.

Commerce Office Opened

Pittsburgh, Oct. 9.—The new local office of the United States bureau of foreign and domestic commerce in the chamber of commerce was opened here Oct. 5. The opening was marked by an inaugural luncheon in the chamber, at which the guests of honor were United States Senator David A. Reed and Congressman Stephen G. Porter.

Britain's Fall Revival Is Mild

Failure of Steelmakers To Realize Expectations Arouses Stronger Demand for Safeguarding of Industries Act—Some Departments Busy—Belgian Mills Book 4000 Tons of Rails—Continental Pipe Producers Negotiating for a Syndicate

European Headquarters,
IRON TRADE REVIEW,
Caxton House, Westminster, S. W.1

LONDON, Oct. 9.—(*By Radio*)—The autumn revival in iron and steel demand is below expectations and the movement for safeguarding of British industries is receiving fresh impetus. Demand for Middlesbrough pig iron is discouraging, September exports amounting to only 8500 tons. Sales of West Coast hematite, however, show some improvement.

Makers of billets are well booked, and British structural engineers also are busy. Sheffield steel manufacturers are co-operating to finance foreign government contracts. Galvanized sheet mills are booked to the end of the year, and demand for tin plate is satisfactory.

A report from Paris states the iron and steel markets continue firm and active; peak prices are believed to have been reached. Billets have been sold at £5 ($24.25) for November delivery to England. Belgian mills have received orders for 4000 tons of rails from the European Rail Manufacturers' association. British pig iron is arriving at £3 7s ($16.24) c.i.f. Antwerp. Berlin reports exports improving, and a better situation in the domestic markets. Continental pipe producers are negotiating for the organization of a syndicate.

British Steel Market Showing Better Demand

Office of IRON TRADE REVIEW,
Prince's Chambers, Corporation St.

BIRMINGHAM, ENG., Sept. 28.—A marked improvement developed, particularly in the steel trade, where new business is manifest under nearly all heads. Probably the liveliest spot is in small bars and billets, British makers now being able to get a little more money for their steel on the strength of improving demand. The continued rise in continental prices has undoubtedly diverted a good deal of business to the home works. Last week a number of German firms intimated that they were unable to supply billets and British makers have profited by this

Sterling $4.85

scarcity to fill their order books. Soft billets have thus advanced to £6 5s ($30.31) and in some cases 2s 6d ($0.60) more is asked. Similarly small steel bars have appreciated to £7 12s 6d ($36.97) owing to inability to get Belgian steel. The rise in continental material since the beginning of the year is believed to constitute a record. Sheet bars, for instance, have increased from £5 19s ($28.86) to £7 5s 6d ($35.28) and No. 3 Belgian iron from £5 17s ($28.38) to £7 2s 6d ($34.55), both figures delivered in this district. This is an important change from the point of view of such Staffordshire industries as the nut and bolt trade and the small rerolled bar department is much affected. One important result is substitution of steel for the raw material and at least one large nut and bolt works has within the last week or two placed an order for 2000 tons of steel bars for nuts.

Plate mills are the one exception to the generally improving tone, and though orders for new ships seem to be placed almost every day, the plate mills have not yet felt any benefit. They have, however, sold good lots for structural work and railway wagon building. Structural engineers have

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, October 8	*British* Gross Tons U. K. Ports		*French* Metric Tons Channel Ports		*Belgium and Luxemburg* Metric Tons Channel Ports		*German* Metric Tons Rotterdam or North Sea Port	
Export Prices f. o. b. Ship at Port of Dispatch—By Cable		£ s d		£ s d		£ s d		£ s d
PIG IRON								
Foundry No. 3, Silicon 2.50-3.00	$16.01	3 6 0*	$15.28	3 3 0	$15.28	3 3 0	$15.76	3 5 0
Basic	15.76	3 5 0	15.28	3 3 0	$15.28	3 3 0	15.28	3 3 0
Basic-bessemer	16.98	3 10 0†	14.79	3 1 0	14.79	3 1 0	14.55	3 0 0
Hematite, Phosphorus 0.02-0.05	16.98	3 10 0	22.09	565*	.....	.....	.....	3 10 0
SEMIFINISHED STEEL								
Billets	$30.92	6 7 6	$24.25	5 0 0	$24.25	5 0 0	$24.25	5 0 0
Wire rods	41.23	8 10 0	29.71	6 2 6	29.71	6 2 6	29.71	6 2 6
FINISHED STEEL								
Standard rails	$37.59	7 15 0	$31.53	6 10 0	$31.53	6 10 0	$31.53	6 10 0
Merchant bars	1.65c	7 12 6	1.38c	6 5 0	1.38c	6 5 0	1.38c	6 5 0
Structural shapes	1.60c	7 7 6	1.13c	5 3 0	1.13c	5 3 0	1.10c	5 0 0
Plates, ship, bridge and tank	1.76c	8 2 6	1.40c	6 7 6	1.40c	6 7 6	1.42c	6 9 0
Sheets, black, 24 gage	2.17c	10 0 0	2.34c	10 12 6	2.34c	10 12 6	2.20c	10 0 0
Sheets, galvanized, 24 gage, corrugated	2.90c	13 7 6	2.97c	13 10 0	2.97c	13 10 0	2.94c	13 7 0
Bands and strips	2.22c	10 5 0	1.57c	7 3 0	1.57c	7 3 0	1.49c	6 15 0
Plain wire, base	2.12c	9 15 0	1.60c	7 5 0	1.60c	7 5 0	1.60c	7 5 0
Galvanized wire, base	2.93c	13 10 0	2.01c	9 2 6	2.01c	9 2 6	2.01c	9 3 0
Wire nails, base	2.38c	11 0 0	1.71c	7 15 0	1.71c	7 15 0	1.67c	7 12 0
Tin plate, base box 108 pounds	$ 4.43	0 18 3	.....	.....	.....	.....	$ 6.79	1 8 0

*Francs

Domestic Prices at Works or Furnace—Last Reported		Francs		Francs		Marks
Foundry No. 3 Pig Iron, Silicon 2.50—3.00	$16.01	3 6 0	$17.20	440(2)	$16.40	590	$18.57	78
Basic pig iron	15.76	3 5 0	18.57	475(1)	16.54	595	20.95	88
Furnace coke	3.15	0 13 0	5.87	150	5.14	185	5.12	21.50
Billets	29.10	6 0 0	21.70	555	27.38	985	28.81	121
Standard rails	1.79c	8 5 0	1.46c	810	1.63c	1,250	1.51c	140
Merchant bars	1.57c	7 5 0	1.30c	720	1.45c	1,115	1.52c	141
Shapes	1.71c	7 17 6	1.22c	675	1.22c	940	1.49c	138
Plates, ship, bridge and tank	1.87c	8 12 6	1.54c	855	1.49c	1,145	1.71c	158
Sheets, black, 24 gage	2.28c	10 10 0	2.92c	1,620	2.47c	1,900	2.43c	225
Sheets, galvanized 24 gage, corrugated	2.96c	13 12 6	3.50c	1,945	3.12c	2,400	3.78c	350
Plain wire	2.12c	9 15 0	1.75c	970	2.02c	1,550	2.48c	230
Bands and Strips	2.22c	10 5 0	1.44c	800	1.89c	1,450	1.77c	164

*Middlesbrough; †Scotch foundry iron; ‡delivered; (1) Basic-bessemer; (2) Longwy. British export furnace coke £0 13s 0d ($3.16) f. o. b. Ferromanganese £21 14s 0d ($105.25) delivered Atlantic seaboard, duty paid. German ferromanganese £15 0s 0d ($72.90) f. o. b.

The equivalent prices in American currency are in dollars per ton for pig iron, coke, semi-finished steel and rails; finished steel is quoted in cents per pound and tin plate in dollars per box. British quotations are for basic open-hearth steel; French, Belgian, Luxemburg, and German are for basic-bessemer steel.

large order books, though the quantities involve small tonnages, from 100 to 200 tons. In Middlesbrough the plate mills are working short time, although the outlook is regarded as much brighter. Last week imports of continental material into the Tees consisted of 4697 tons of steel sheet bars. Orders on books at Barrow indicate some expansion, though they do not represent more than about six weeks' work. Rail mills and merchant mills are fully employed, and there is increased activity at the hoop works where substantial orders are held. A brisker trade is reported in billets and a steady demand for small steel sections.

Sheffield steel works have experienced better trade in the cheaper grades of steel, such as have been imported recently. Tool steel departments are quiet, but the most active spot is the basic steel plant works at Templeborough which has a good demand for the softer qualities of basic billets and slabs. For high quality acid steels and higher carbon basic steels there is as yet no awakening of the market.

The demand for pig iron is slowly expanding and prices are firm in all districts. Middlesbrough smelters are complaining this week that local consumers are supplementing contract deliveries with supplies of Northampton pig iron. Probably this accounted for the firm attitude adopted by Northampton furnacemen on the Birmingham exchange yesterday when they were inclined to force up the price over the recent level of £2 15s 6d ($13.45). Consumers, however, are not disposed to pay more and are placing their orders which up to now have been for small parcels with those makers quoting the price mentioned above. Derbyshire makers are quoting £3 ($14.55). Some east coast hematite at £3 10s ($16.97) has been brought to the Midlands and some Welsh hematite at £4 2s 6d ($20) delivered. This iron serves for the high-class castings which are still sold in good quantities from South Staffordshire, this district being a recognized source of supply for the machinery used in the Welsh tin plate trade. The Middles position on the whole shows signs of an early improvement, and inquiries are encouraging. No imports of continental iron have come into the Tees for some weeks past. Makers' stocks are low and as supplies become scarce consumers are not so keen to secure price concessions. Scottish consumers are taking more iron, but the export trade is still disappointing. An active tone is maintained in the hematite trade and the sales are more frequent with home and continental consumers.

Staffordshire iron trade is not doing much business except in high-grade iron, although even this department could handle a good deal more work. The competition between Staffordshire and other districts in crown iron keeps values low and nut and bolt iron is much too dear to be of use to local producers.

The firm position of galvanized sheets is maintained at £13 10s ($65.46) as a minimum, while some works want 5s ($1.21) more for prompt delivery. Swansea makers report good buying from India. Most of the Midland mills are booked up until December.

French Ore Output Low

Paris, Sept. 19.—(*European Staff Service*)—The output of iron ore in France during July was less than in June. Stocks at the end of the month were the lowest for the year. The following table gives figures for the first seven months of 1928 as compared with the monthly averages of the three preceding years and 1913, in metric tons:

Mon. ave.	Production	Stocks at end of month
1913	1,826,500	.....
1925	2,943,204	.....
1926	3,269,033	.....
1927	3,723,200	.....
1928		
Jan.	4,122,386	2,668,569
Feb.	3,889,642	2,627,592
March	4,208,746	2,624,396
April	3,698,631	2,358,872
May	3,973,447	2,380,444
June	4,200,792	2,319,649
July	4,080,816	2,281,943

Belgian Steel Prices Tend to Higher Levels

BRUSSELS, Sept. 25.—(*European Staff Service*)—The tendency of the Belgian iron and steel market continues toward higher prices, and a gradual increase is noted from week to week. However, the increases do not give rise to anxiety as to a sudden reaction. Orders are taken by the Belgians, the French and the Germans according to their respective commitments. The decision of the European steel entente to maintain the production quota at its previous level has had a good effect and shows that continental iron and steel makers definitely wish to stabilize the market and the conditions of output. It is to be noted that this decision is the only one of importance taken by the entente, and

Franc 2.78c

that the question of international selling syndicates was not discussed. In Belgium there has been a rise in wages in the iron and steel works to the extent of 2½ per cent, dating from Sept. 20, and a second advance of 2½ per cent is provided for as from Nov. 10.

The price of merchant bars has even exceeded expectations and now has reached £6 5s ($30.25) per ton f.o.b. Antwerp; this price has been obtained by both German and Belgian producers. The price of beams still lags behind, but a slight adjustment has been made and normal profiles now are offered at £5 2s ($24.65), the domestic price being 940 Belgian francs, which corresponds to £5 9s ($26.40); British sizes are quoted at from £5 3s to £5 4s ($25 to $25.24). Beams have been offered by the Acieries de Micheville in France. The price of semifinished steel is nominal because few producers are in the market. Quotations for 2-inch billets have reached £4 19s ($24), and sheet bars are £5 ($24.15). Plates 3/16-inch are £6 10s ($31.45), and sheets are £6 14s ($32.50). Galvanized sheets one millimeter thick are quoted at £13 ($63). The basis price of wire rod now has been fixed by the international syndicate at £6 2s 6d ($29.70).

Better World Steel Market Seen by German

LONDON, Sept. 25. — (*European Staff Service*)—Dr. Ludwig Hof, in an article published by *Berliner Boersen Zeitung*, discusses the trend of international iron and steel prices in 1926, 1927, and 1928 up to the end of the third quarter. He shows that toward October, 1926, iron and steel prices reached a comparatively high level, due to the fact that a considerable demand for iron and steel originated from Great Britain following the cessation of the coal stoppage. Very soon, however, prices began to drop, and this tendency continued to the end of the summer of 1927, when prices had reached an extremely low level. Dr. Hof explains that this depression in prices was due to the fact that although the French franc had been stabilized, French works had considerably over-stocked themselves with iron and steel during the period when the franc was at a low rate. At the same time, British iron and steel works gradually were increasing production, and consequently the heavy demand from that source for continental iron and steel gradually decreased.

About the end of 1927 the situation was reversed, and French industries began to feel the beneficent effects of stabilized conditions. Iron and steel works then were under the necessity of replenishing their stocks, and considerable demand for iron and steel products gradually materialized. At the same time, the cost of production in Germany had been increasing, and consequently sales prices also reached a higher level. In the conclusion of his article, Dr. Hof states that conditions at the present time are essentially different to what they were in the autumn of 1926, and, far from anticipating a new decline in prices, he expects that any reaction which may follow the high level which now is prevailing will not in any way compare with the low levels of 1927.

CONSTRUCTION and ENTERPRISE

Concise Timely Business Building Opportunities from Field of Industry

North Atlantic

BUCKLAND, CONN.—E. E. Hilliard Co. has awarded the contract for a power house to the Manchester Construction Co., 875 Main street, South Manchester.

OSCEOLA, ME.—West Missouri Power Co., Pleasant Hill, plans the construction of a hydro-electric power plant and dam on the Osage river, here.

HALPINE, MD.—William Wagner has been awarded the contract for the construction and establishment of an airport here for Major J. M. Horton, 4439 Klingle road.

BOSTON—General X-Ray Co. of Michigan has been incorporated with $100,000 in preferred stock to manufacture electrical, electro-medical apparatus, surgical appliances, etc., by Laurence E. Gott, Swampscott, Mass.

NEWTON, MASS.—Plans are completed and the contract has been let for a 2-story plant, 50 x 100 feet, for the Davidson Fan Co., 15 Brook street.

WORCESTER, MASS.—Precision Electric Tool & Mfg. Co. has been incorporated with $100,000 capital to manufacture and deal in all sorts of machinery and tools by Albert W. Blackmer, 340 Main street, Worcester.

ELIZABETH, N. J.—Linden Iron Works Inc. has been incorporated with $125,000 capital to manufacture and deal in iron and steel by Wellcheck & Wellcheck, Elizabeth, attorneys.

JERSEY CITY, N. J.—A dry storage warehouse will be built by the Delaware, Lackawanna & Western railroad on a 15-acre plot here. The main building will be of steel, concrete and brick, 162 x 848 feet. The terminal will be located between the existing terminals of the railroad, the ferries and the vehicular tunnel.

NEWARK, N. J.—Newark Transformer Co., 17 Frelinghuysen avenue, contemplates erecting a plant.

WEST NEW YORK, N. J.—Brinkerhoff Electric Co., New York, plans the construction of a 2-story lamp plant, 70 x 180 feet. Lockwood, Greene & Co. Inc., 100 East Forty-second street, are engineers.

ASTORIA, N. Y.—Klein Iron Works, 65 Broadway, plans to build a 1 and 2-story plant and office building, 101 x 139 feet.

BINGHAMTON, N. Y.—Metallurgical Equipment & Supply Co., organized recently, plans to manufacture furnaces and machinery for metallurgical production and will operate a plant.

BROOKLYN, N. Y.—Improved Cinders Co., 90 West street, New York, will build a 2-story cinder reducing metal plant, 24 x 132 feet.

CHEEKTOWAGA, N. Y.—G. Elias & Bro. contemplates erecting an airplane manufacturing plant, 1 and 2-story.

GREEN ISLAND, N. Y.—Ford Motor Co., Detroit, plans expansion at its plant here and is installing equipment for the manufacture of shock absorbers.

MEDINA, N. Y.—Medina Iron & Brass Co. plans to build a foundry addition, 75 x 260 feet. Thomas Boyd is vice president and manager of the company.

NEW YORK—Savonius Rotor Co. of America has been incorporated with $10,000 capital by S. List, 276 Fifth avenue, attorney.

NEW YORK—Continental Wire Corp. has been incorporated with $5000 capital by I. Schon, 11 Park place, attorney.

NEW YORK—Marvin Metal Novelty Corp. has been incorporated with $300 capital by J. L. Mushin, 291 Broadway, attorney.

NEW YORK—J. Klein Iron Works has been incorporated with $150,000 capital by H. Koch, Long Island City, New York, attorney.

NEW YORK—Electro-Magnetic Clock Corp. has been incorporated with $50,000 capital by A. H. Goodman, 1482 Broadway, attorney.

NEW YORK—Eugene Lucchesi has been incorporated with $50,000 capital to manufacture and deal in metal castings by Q. J. Porcella, 305 Broadway, attorney.

NEW YORK—Peerless Spring & Mfg. Co. has been incorporated with $6000 capital to manufacture novelties, by A. Decicco, 4634 Third avenue, attorney.

NEW YORK—T. E. Conklin Brass & Copper Co., 54 Lafayette street, will expand its plant on property recently purchased at 113 Leonard street.

NEW YORK—Boltland Mfg. Corp. has been incorporated with $10,000 capital to manufacture and deal in radios by T. Berger, 132 Nassau street, attorney.

NEW YORK—Triangle Gear & Piston Ring Corp. has been incorporated with $20,000 capital by B. H. Berman, 51 Chambers street, attorney.

NEW YORK—Gas Flow Alarm has been incorporated with $50,000 capital to manufacture and deal in tools by F. M. Verrilli, 420 Lexington avenue, attorney.

NEW YORK—Funk Printing Press Co., 150 Nassau street, printing press manufacturer, will establish a 1-story plant, 40 x 400 feet, on property near Plainsboro, N. J., which the company acquired recently.

NEW YORK—Salvage Heating Appliance Co.

(*Continued on Page* 965)

Resale Equipment News

MACHINERY, equipment and tools of the Carroll Foundry & Machine Co., Bucyrus, O., will be sold at public auction, Oct. 30, by the Industrial Plants Corp. The sale will include planers, shapers, milling machines, horizontal boring mills, radial drills, grinders, turret lathes, vertical boring mills, hammers, punch and shear, wheel press, complete foundry and pattern shop equipment. Most of the tools are motor-driven.

* * *

The entire plant and property of the Pittsburgh Tin Plate & Steel Corp., Marietta, O., will be sold at public auction, Oct. 13, at 1 p. m. The sale will include all buildings, machinery, equipment and 12 acres of ground. The total appraisement of the property is $74,400. B. B. Putnam of Marietta is the co-receiver.

* * *

All the equipment and machinery of the Diamond Bronze Co., bankrupt, Cleveland, will be sold at auction, Oct. 11, by W. A. McCoy, auctioneer. The material includes five Gaskill furnaces, three air squeezers, pneumatic squeezer, blast cabinet, electric riddle, skimmer, motor, aluminum furnace blower, hoist and swing crane, four hand squeezers, tumbling barrel, electric grinder, drill press, two band saws and motors, steel flasks, air compressors, trucks, scales and tools.

Sales Calender

Oct. 9-11—*Warwick Iron & Steel Co. real estate and equipment to be sold at auction in liquidation.*

Oct. 11.—*Auction sale of equipment of Diamond Bronze Co., Cleveland.*

Oct.* 11.—*Auction of navy surplus and surveyed material at Norfolk, Va., navy yard.

Oct. 13.—*Public auction of plant and property of the Pittsburgh Tin Plate & Steel Corp., at Marietta, O.*

Oct. 18—*Auction sale of property of O. Armleder Motor Truck Co., Cincinnati.*

Oct. 30.—*Auction sale of machinery and equipment of the Carroll Foundry & Machine Co., Bucyrus, O.*

Machinery

Fall Buying Begins to Show Activity and Crane Market Is Moving Better—Railroad and Industrial Demand Increases

INCREASED activity is apparent in the machine tool and crane market and all classes of tool users are showing better interest. Recent buying includes some lists which have been pending for several months and have just reached the point of closing, indicating an end of indecision in their case. Some railroad inquiry is apparent, in addition to general industrial activity. Electrical appliance manufacturers are active and both General Electric and Westinghouse are taking additional equipment. Considerable activity has been developed in crane requirements and some have been bought for export.

Used tool inquiry is active in some markets. Many orders are for single tools. The crane market is only moderately active.

New York, Oct. 9.—Buying of machine tools is being well maintained, although there are few important lists. The General Electric Co. has bought a few machines recently for Schenectady, N. Y., Lynn, Mass., and Pittsfield, Mass. Railroad activity continues sluggish, with only one or two machines reported placed. Judging from the rate of buying thus far, most sellers predict as active a month as September, although some believe it will fall short of one or two summer months, when heavy buying on the part of two or three companies made for unusually good business.

Recent orders booked by Pratt & Whitney Co. include three 6-inch vertical shapers, three 6 by 20-inch thread millers, two 4½ by 12-inch thread millers, three jig borers, two profilers, seven deep hole drillers, two 6-spindle vertical deep hole drillers, one 8-inch rotary surface grinder, one 5-inch production hand miller, one 16 by 36-inch lathe, and one 20 by 48-inch lathe. The Niles Tool Works has closed on a 42 by 14-foot planer.

New York Central has issued inquiries for one 42-inch gear head lathe and two journal turning lathes.

Pittsburgh, Oct. 9.—The machine tool market shows more activity in new inquiry and awards. One interest reports the receipt of a substantial volume of business recently, most of which, however, has been pending for many months and is scattered among a number of users. Large awards continue few, practically all buying consisting of only a few tools. The Westinghouse Electric & Mfg. Co. is taking bids on 57 tools, included in its fourth quarter list. This is about the same volume of business as its third quarter purchases. More inquiries are appearing for cranes and although a number of jobs are pending, awards have been few.

Chicago, Oct. 9.—Inquiries for machine tools are numerous, most being in scattered lots of one to a half dozen items, but sales are lighter as compared with recent weeks. Western railroad buying is almost all completed, and little is expected in the way of railroad lists in this market in the next few months. Chicago, Milwaukee, St. Paul & Pacific is closing on its recent inquiries, and the Santa Fe is inquiring for a double wheel heavy duty floor grinder, and several other tools. Industrial users purchased additional radial drills and punch presses. Sheet metal shop equipment is in good demand. Machine tool sales in this district during the past nine months are reported as the best since 1918, and August sales were a record for that month. The tools being purchased by the International Harvester Co. for its Farm-all tractor plant at Rock Island, Ill., will run to about $200,000. Used tool inquiry continues active. Shipments on orders are heavy, some dealers reporting the highest billing of the year.

Study Waste Salvage

New York, Oct. 9.—Large attendance is expected at the fall meetings of the National Association of Waste Material Dealers, Inc. at Hotel Astor, Oct. 16 and 17.

One of the features of the association is the growth of the newly formed salvage division, containing nearly a score of companies. They are large manufacturers who are interested in saving waste materials. Among the metal companies now in this division are the following: Eagle-Picher Lead Co., Grasselli Chemical Co., Scovill Mfg. Co., and United States Steel Corp. Other concerns are among the most important in electrical machinery, rubber, powder, automobiles, chemicals, and other products. This division will have its meeting Oct. 17 at 11:30 o'clock.

The metal division will meet Oct. 17, at 10 o'clock.

The entire association will meet at 2 o'clock Oct. 17, and the board of directors at 3 o'clock the same day. The scrap iron division will meet at 3 o'clock Oct. 16. Several of the other divisions will hold their meetings the same afternoon. A luncheon for all members will be served at the Hotel Astor, Oct. 17.

The October meetings will furnish the only opportunity for members to get together in the East for a long time, as the annual meeting and banquet in March next year are to be held in Chicago. This will also be the first general meeting of the association in which representatives of the large industrial concerns now holding membership will be present, as the salvage division was organized only last June.

CRANE ORDERS PLACED

Seven crawler and four truck cranes for Dwight P. Robinson & Co., for South America, to Harnischfeger Corp.

10-ton handpower crane, 30-foot span for a stone yard in New England.

3-ton handpower crane, 22-foot span, placed through a dealer for a New England paper company, and 700-foot, 8-inch I-beam monorail system, two tons capacity, for a Connecticut company, all going to New Jersey Foundry & Machine Co.

CRANE ORDERS PENDING

Six crawler cranes for Pennsylvania railroad.

15-ton used electric crane, 69-foot span, for Apollo Steel Co., Apollo, Pa., sheet manufacturer.

Six 5 or 7½-ton electric cranes, 60-foot span, for the Waterfront Service Co., Brooklyn, specifications being issued through Moores & Dunford, 110 East Forty-second street, warehouse engineers.

Fifteen special shoveling machines reported contemplated by Patrick McGovern Inc., 50 East Forty-second street, New York City, recently awarded a $43,000,000 contract for constructing a water tunnel from Yonkers, N. Y., to South Brooklyn, for the New York board of water supply.

Castings Output Gains

Washington, Oct. 9.—August production of malleable castings gained over the total for July according to statistics of the department of commerce. Following are monthly comparisons:

	Total tons produced	Per cent of capacity	Total tons booked	†Monthly capacity
1926				
Total	715,384	54.7	607,949	1,307,889
1927				
August	51,394	48.6	42,515	105,717
Total (8 mos.)	450,692	43.2	402,913	846,379
September	45,210	43.3	37,912	104,401
October	46,765	46.	39,494	101,606
November	40,845	40.5	34,624	100,778
December	47,876	47.6	49,215	100,685
Total (year)	631,388	50.4	564,158	1,253,849
1928				
January	54,818	59.6	53,153	92,016
February	59,045	63.8	55,452	92,496
March	*63,322	69.6	60,697	91,043
April	56,880	62.5	53,099	91,019
May	61,458	67.3	54,429	91,296
June	60,779	*66.6	51,388	*91,259
July	*54,373	59.9	*52,128	90,759
August	61,833	68.5	56,415	90,311
Total (8 mos.)	472,508	64.7	436,761	730,200

†Capacity during 1927 has been based on following formula: "Total number of units of molding floor space times average production per molder per day per unit of floor space, times number of actual working days per month." Beginning January, 1928: "Average monthly production for the best six consecutive months since Jan. 1, 1919, is to be taken as a practical monthly capacity."

*Revised.

Average value of domestic fluorspar produced in 1927 was $18.08 per net ton, compared with $18.20 in 1926.

Construction and Enterprise

(*Continued from Page 963*)

has been incorporated with $50,000 in preferred shares and 1000 shares no par value stock to manufacture and deal in heaters, etc., by G. A. Grayzel, 2 Lafayette street, attorney.

NIAGARA FALLS, N. Y.—City of Niagara Falls, W. D. Robbins, city manager, plans to establish a municipal airport.

TROY, N. Y.—Speedy Mfg. Co. has been incorporated with $25,000 capital to manufacture and deal in cutting and slicing machines by F. McLean, Watervliet, attorney.

ERIE, PA.—Erie Foundry Co., West Twelfth street, plans the construction of an addition to its plant and has awarded the general contract to the Henry Shenk Co. and the Erie Steel Construction Co. Work of demolishing the building housing the machine shop will start at once.

PHILADELPHIA—Railway Track Work Co., East Thompson and Clementin streets, plans the construction of a 1-story plant, 55 x 100 feet.

PHILADELPHIA — Philadelphia Air Terminal of Pennsylvania Inc., 225 South Fifteenth street, plans to build a large airport at Swanson and Fifth streets.

PHILADELPHIA—Pennsylvania Gypsum Co. has completed plans for the construction of a pier and installation of conveying and hoisting equipment necessary to handle the gypsum rock at Chester, Pa., where the company's plant is located.

READING, PA.—Carpenter Steel Works suffered loss in an explosion and fire Oct. 6. Twenty rolling mills were badly burned. Plans for rebuilding were begun immediately.

READING, PA.—Reading Iron Co. plans to establish a cut nail and galvanizing plant at Pottstown, Pa., and will discontinue its plant at Birdsboro, Pa. The equipment from Birdsboro will be moved to Pottstown.

VANDERGRIFT, PA.—Several departments of the Vandergrift plant of the American Sheet & Tin Plate Co. will be reconstructed and work has started in some sections on the project.

YORK, PA.—Beaver Saw Filing Machine Co. plans to operate a plant here for the manufacture of tools for sharpening hand and circular saws.

PROVIDENCE, R. I.—Work on the 1-story plant, 44 x 103 feet, for the Builders Iron Foundry Co., Codding street, has been started. Some equipment remains to be purchased.

AURORA, ILL.—All-Steel Equipment Co., Griffith avenue, has completed plans for its 2-story plant and office building addition.

CHICAGO—Sonatron Tube Co., which recently completed a new plant and installed new equipment, plans further expansion to take place in a short while. Harry Chirelstein is vice president of the company.

CHICAGO—Brown Products Corp., 40 North Dearborn street, has been incorporated with $40,000 capital to manufacture and deal in heaters, stoves, heating devices, etc., by John Keane, Ralph Brown and William H. Stevenson.

CHICAGO—Industrial Supplies Co. Inc., 913 West Washington street, has been incorporated with $10,000 capital to manufacture and deal in machinery, engines, tools, etc., by Charles M. Kopy and Harry Krom.

CHICAGO—Lumitone Corp. of America, 111 West Monroe street, has been incorporated with 10,000 shares no par value stock to manufacture and deal in machinery, fixtures, reflectors, etc., by John Howard, Albert M. Wolf and Frank A. Sexton.

CHICAGO—Chicago & North Western railroad, 226 West Jackson boulevard, contemplates new construction and equipment work in connection with its division terminal at Iron River, Mich., involving roundhouse, machine shop and general storehouse construction.

PEORIA, ILL.—National Airways Corp. plans the construction of an airplane manufacturing plant, hangars and a passenger station. Jameson-Harreson, Peoria Life building, are architects.

ROCKFORD, ILL.—Stephen & Wolff Inc., Latham and Fulton streets, has completed a 60-foot addition to its foundry building and will increase its space for machine shop quarters.

ANDERSON, IND.—Anderson Stove Co. plans expansion of its properties when the new North Anderson sewer is completed.

GREENSBURG, IND.—Cyclone Fence Co., F. Bruce, superintendent, contemplates the construction of a manufacturing plant addition.

LAFAYETTE, IND.—Indiana Wire & Iron Works has been incorporated with 1000 shares no par value stock to do a general business of manufacturing, buying and selling of all kinds of wire, iron and metal products by James C. Farrington, Irene L. Farrington and Winfield S. Crum.

DETROIT—Chrysler Corp. is planning the construction of a new plant at Oakland, Calif., for the assembly of Chrysler and Dodge cars.

DETROIT—Gannon Machine & Motor Co., 651 Plum street, is inquiring for lathe and drill press.

DETROIT—Monarch Tool & Mfg. Co., 2704 East Larned street, is inquiring for a screw machine with a capacity of not under 1½ inch.

DETROIT—Lincoln Mfg. Co., 2630 Erskin street, is inquiring for miscellaneous equipment for the manufacture of electrical supplies for a proposed 4-story plant addition, 85 x 100 feet.

DETROIT—Stinson Aircraft Corp. is offering new stock, proceeds from which will go towards financing a new plant which is now contemplated.

DETROIT—Joseph N. Smith Co., manufacturer of automobile hardware and small parts, has awarded the general contract for its 2-story manufacturing plant addition to W. E. Wood & Co. (Noted Oct. 4.)

DETROIT—General Metal Weather Strip & Screen Co. Inc., 7908 West Jefferson avenue, has been incorporated with $5000 capital to manufacture and deal in metal weather stripping, screens, etc., by John Ferency, 1848 West Grand boulevard.

FERNDALE, MICH.—General contract for the tube mill building for Steel & Tubes Inc., Cleveland, has been awarded to Cooper-Little Co. Sessions Engineering Co., Chicago, prepared plans for the construction. (Noted Aug. 2.)

FLINT, MICH.—A C Spark Plug Co., Harriet and Industrial avenue, is inquiring for ovens for heat treating process for proposed 1-story manufacturing plant 144 x 275 feet for die casting department.

LANSING, MICH.—New Way Motor Co. is contemplating expansion of its production and plans increasing its working capital.

MARSHALL, MICH.—Michigan state highway department is building a garage and machine shop, 50 x 105 feet, to repair machinery.

MUSKEGON, MICH.—Muskegon Piston Ring Co. contemplates enlarging its present plant.

MUSKEGON HEIGHTS, MICH. — Standard Self Locknut Co. has been incorporated with $10,000 capital to manufacture metal products and specialties.

HINTON, W. VA.—West Virginia Hydro-Electric Co., Charleston, W. Va., plans the construction of three hydroelectric plants in Raleigh and Summers counties, each to have 7000 horsepower.

APPLETON, WIS.—Advance Car Mover Co., manufacturer of manual appliances for moving freight cars, has let the general contract to the Austin Co., Cleveland, for erection of a new manufacturing plant at 930 East John street.

CLINTONVILLE, WIS.—Wisconsin Power & Light Co., 16 North Carroll street, Madison, Wis., has let the general contract to Fred Lemke, this city, for its new local district headquarters, consisting of an office, 30 x 80 feet; a garage and service shop building, 50 x 65 feet, and a storage building, 45 x 106, all two stories and about 109 x 160 overall.

EAU CLAIRE, WIS.—Northwestern Steel & Iron Works has started work on a 1-story addition, 48 x 100 feet.

GREEN BAY, WIS.—Mads Madsen, National building, Minneapolis, is low bidder for the general contract on the new Green Bay Vocational school, 3-story, 120 x 150 feet, fireproof. Plans are by Architects Foeller, Schober & Berners, Green Bay.

LACROSSE, WIS.—National Gauge & Equipment Co., subsidiary of the Moto Meter Co., Long Island City, N. Y., plans to extend the main plant, with a 2-story addition, 130 x 160 feet, and a large addition is also being built to the boiler house. The new work will provide for the manufacture of a newly developed type of electric gasoline gage.

MADISON, WIS.—University of Wisconsin contemplates the construction of an electrical laboratory and a materials testing laboratory. C. A. Halbert, Capitol building, is state chief engineer.

MADISON, WIS.—Hawthorne Building Co., 1 South Pinckney street, will build a garage, sales and maintenance building for the Nash Sales Co., Charles Littleton, president, 702 East Washington avenue. Architect Fred L. Kronenberg is ready for bids.

MADISON, WIS.—Ray Andrews, 1101 Harrison street, is about to place contracts for the erection of a 2-story and basement garage and repair shop, 66 x 113 feet, at Johnson and Patterson streets. Plans are by Claude & Starck, local architects.

MANITOWOC, WIS.—William E. Parr Auto Co., York street, has let contracts for the erection of a garage and repair shop on Buffalo street.

MANITOWOC, WIS.—National Tinsel Mfg. Co. plans the construction of a 3-story plant addition, 50 x 150 feet. The company manufactures Christmas tree decorations, tinsel rope, etc., and work will be rushed to make possible increased production for the holiday trade.

MENASHA, WIS.—City Clerk John Jedwabny Jr., closes bids Oct. 16 on additional equipment

for the municipal water and light plant, including another diesel engine, generators, motors, switchboard, etc.

MENASHA, WIS.—Engineers Orbison & Orbison, 110 West College avenue, have completed plans and are about to ask bids for a new boiler house for the John Strange Paper Co., Washington street.

MILWAUKEE—Zenith Foundry Co., 567 Seventy-fifth avenue, West Allis, has broken ground for a foundry addition.

MILWAUKEE—Oilgear Co., E. K. Swigart, president, 659 Park, has awarded the contract for a 1 and 2-story plant addition to Worden Allen Co., 208 South La Salle street, Chicago.

MILWAUKEE — Seaman Body Corp., 1732 Richards street, has awarded the general contract for a 1-story power house addition to Worden Allen Co., 208 South LaSalle street, Chicago. (Noted Sept. 27).

MILWAUKEE—Allis-Chalmers Mfg. Co. has awarded the general contract for a 2-story plant addition, 60 x 116 feet, to the administration building of the tractor department, in West Allis.

MILWAUKEE—Milwaukee Foundry Equipment Co., 284 Seventh avenue, will erect a modern building for the manufacture of molding machines on property recently acquired, totaling 92,000 square feet.

MILWAUKEE—Maynard Electric Steel Casting Co., 1328 Twenty-second avenue, has started work on the erection of a 1-story foundry addition, 100 x 121 feet. Frank J. Wabiszewski is secretary and general manager.

MILWAUKEE—Bids will be taken after Oct. 10 for the erection of the new municipal testing laboratory, 80 x 40 feet, 2-story and basement, at Forty-seventh and Vliet streets. Plans are by City Architect C. E. Malig. R. E. Stoelting is commissioner of public works.

MILWAUKEE—Milwaukee Tank Works, 1615 Fratney streets, maker of wooden and metal tanks, gasoline filling station pumps, etc., has increased its capital stock from $100,000 to $550,000. Further enlargement of the plant is in early prospects, but plans have not been completed. R. L. Bienenstok is president.

MILWAUKEE—The board of education of Shorewood, suburb of Milwaukee, has accepted the bid of Pehrson Bros., 555 Gateway building, for the general contract on a new arts and science building and a central heat and power plant for the Shorewood high school group. Plans are by Architects Herbst & Kuenzli, 130 Wisconsin avenue, Milwaukee.

RACINE, WIS.—Nash Motor Co. contemplates the erection of a forge and heat treatment building addition.

RACINE, WIS.—A charter has been granted the C. H. Driver Mfg. Co., 1445 College avenue, to manufacture and market abrasive materials and sandpaper belts. The incorporators are Charles H. Driver, John D. Rowland and John S. Rowland.

SHEBOYGAN, WIS.—Fuchs & Martin, 701 Center avenue, will take bids after Oct. 17 through Architect Edward A. Juul for the erection of a new sales and service station, 45 x 120 feet, part 2-story and basement.

WAUKESHA, WIS.—The common council has appropriated $9700 toward the purchase of a site for the proposed new Waukesha vocational school. Harry L. Horning, president of the Waukesha Motor Co., is president of the board of vocational education. The work is to be completed before Sept. 1, 1929.

WAUSAU, WIS.—Ford Garage, P. J. Portman, Fourth and Forest streets, has placed contracts for the erection of a sales and service building, 111 x 112 feet, 1-story and part basement, planned by R. W. Dwyer, 187 Twenty-seventh street, Milwaukee.

Southern States

HOT SPRINGS, ARK.—Sleepy Water Co., Sleepy Springs, plans the construction of a power plant in connection with its new water station and laboratory.

PALMETTO, FLA.—City of Palmetto, J. W. Summitt, commissioner of public works, is receiving bids for a diesel engine, pumping machinery and other equipment for a power and pumping plant.

PENSACOLA, FLA.—T. W. Huckle, Detroit, plans the construction of a plant for the manufacture of stump pullers.

AUGUSTA, GA.—Savanna River Electric Co. plans the construction of a hydroelectric plant on the Savannah river, near here.

LOUISVILLE, KY.—Robert B. Taylor, Anchorage, will build a plant for the Lewis Mfg. & Supply Co., manufacturer of kitchen equipment, at Brook and Bloom streets.

NEW ORLEANS—American Solvent & Chemical Corp., plans the construction of a power plant and the installation of power equipment, to replace a recent fire loss.

RICHTON, MISS.—Central States Electric Co. is building a large new electric light plant here.

GREENSBORO, N. C.—Gibbs Machine Co. has been incorporated with $100,000 capital to carry on the business of the R. A. Gibbs Machine Co., by John G. Bentley, 207 North Park drive.

BARTLESVILLE, OKLA.—City of Bartlesville plans the construction of an airport and exposition grounds.

COLUMBIA, S. C.—General Gas & Electric Corp., New York, plans the addition of a 30,000-kilowatt unit to its steam power plant at Parr Shoals. W. S. Barstow & Co., of which the General corporation is a subsidiary, will have its construction division build the addition.

DENTON, TEX.—City commissioners plan the construction of a new unit for the municipal power plant and also will install a new pump.

HOUSTON, TEX.—Dedman Foundry & Machine Co.'s plant was damaged in a fire recently.

RICHMOND, VA.—Plans are reported to have been completed for an addition to the plant of the Richmond Car Works, which will double the company's capacity. The Richmond company is a subsidiary of the Standard Steel Car Co.

West Central

CROOKSTON, MINN.—Lappen Foundry has started work on its addition, 60 x 120 feet.

KANSAS CITY, MO.—American Eagle Aircraft Co., 2800 East Thirteenth street, plans to enlarge its airplane manufacturing plant and has issued stock for financing.

ST. LOUIS—P. Jacks Co., 119 North Seventh street, soon will start work on its 1-story tin and metalworking shop, 100 x 126 feet.

PONCA, NEBR.—Ponca will have a municipal electric light plant with diesel engines following adoption of the project by the city council recently. The site for the plant is on Main street. Betts & Blummer will have charge of construction.

Western States

LONG BEACH, CALIF.—Perfect Caster Mfg. Co., has awarded the contract for a 2-story manufacturing plant addition, 77 x 115 feet.

LOS ANGELES—Alloy Steel & Metal Co., 1862 East Fifty-fifth street, plans the construction of a 1-story machine shop, 65 x 84 feet.

LOS NIETOS, CALIF.—Fluid Packed Pump Co. plans the construction of a 1-story machine shop at Norwalk and Puente Mills roads.

ORANGE, CALIF.—California Wire & Cable Co. plans the construction of a 1-story plant addition.

SAN FRANCISCO—Premier Bed & Spring Co., 5700 Third street, has awarded the contract for the construction of a 1-story plant addition.

SAN FRANCISCO—City, L. Leavy, purchasing agent, is inquiring for machinery and equipment for general shops and sheet metal equipment for Daniel Webster high school. Also for sheet metal equipment for Ethan Allen school.

EVERETT, WASH.—George L. Barnes contemplates the construction of a 1-story brass foundry, to be built at Centralia, Wash.

SEATTLE, WASH.—Great Northern railroad has completed plans and will begin work shortly on a roundhouse 160 x 450 feet of 24 locomotive stalls at Interbay. Heavy machinery, cranes and other equipment will be installed.

New Construction and Enterprise

MEDICINE HAT, ALTA.—Medicine Hat Motors Ltd. has been incorporated to manufacture and deal in motors, engines, machinery implements, etc., with $100,000 capital by Stephen L. Manzer, William Barnacal, and Edward E. Heckbert.

MERRITT, B. C.—Southwestern Engineering Corp., Los Angeles, and Merritt, B. C., has been awarded general contract for a 50-ton stamp mill here for the Aberdeen Mines Ltd.

WINNIPEG, MAN.—General Window Products of Canada Ltd. has been incorporated to manufacture and deal in window frames, doors, and sashes of any material, with 50,000 shares of no par value stock by Walter S. Linton, Albert Chapman and Herbert R. Lyons.

STIRLING, N. S.—British Metal Corp., R. E. Legg, manager, plans erection of a 200 or 250 ton concentrate mill here in connection with zinc-lead deposits in Richmond county.

CHATHAM, ONT.—F. Brown, 85 Raleigh street, has been awarded contract for addition to plant of the Dowsley Spring & Axle Co., 81 St. George street. Building to be 60 x 75 feet.

GALT, ONT.—Dominion Tack & Nail Co. Ltd., has awarded contract to G. H. Thomas & Sons Ltd., Dickson street, for an addition to its plant to be 1 story, 60 x 98 feet. Subtrades will be let. John Evans, Water street, is architect. (Noted Sept. 20.)

HORNING'S MILLS, ONT.—John S. Allen is in the market for a planer, 16 or 20-inch by 6-inch capacity; also a 28 or 32-inch band saw.

OTTAWA, ONT.—Ottawa Sheet Metal Works Ltd. has been incorporated to manufacture and deal in sheet metal products, with $50,000 capital by John H. Pook, Robert Henham and Clarence W. Marshall.

OTTAWA, ONT.—Lea & Hawley Ltd. has been incorporated to manufacture and deal in automobiles, auto cars, and motor engines, with $50,000 capital by Vivian S. McClenaghan, Austin O'Connor, and Redmond Code.

PETERBOROUGH, ONT.—Canadian General Electric Co., Toronto, Ont., has awarded general contract to the Ferguson Contracting Co. Ltd., Confederation Life building, Toronto, for a punch press building on Park street, here. Building to be 1-story, 110 x 428 feet, steel and brick construction. (Noted Aug. 30.)

TIMMINS, ONT.—Canadian Berggren Ltd. has been incorporated to manufacture and deal in oil burners, oil furnaces, pumps, etc., with 200,000 shares of no par value stock by Dean Kester, Alfred F. Cook and Louis Hudson.

TORONTO, ONT.—Additional contracts have been awarded in connection with plant addition on Sorauren avenue for the Dominion Bridge Co. (Noted Aug. 16.)

TORONTO, ONT.—Plans for a factory on Weston road, for Willys-Overland Ltd., are being revised by M. J. Streyffert, engineer. New tenders will be called. Building to be 4 story, 60 x 260 feet.

TORONTO, ONT.—A number of subtrades have been let for machine shop on Eastern avenue for Link-Belt Ltd. Jackson-Lewis Co. Ltd., 1114 Federal building, has the general contract. (Noted Sept. 13.)

TORONTO, ONT.—Kellogg Mfg. Co. Ltd. has been incorporated to carry on the business as iron founder, mechanical engineer, and manufacturer of machinery, tools, implements etc., with $10,000 capital by Richmond W. Hart, Charles H. C. Leggott, and Jessie M. Perry.

TORONTO, ONT.—World Fibre Corp. has been incorporated to manufacture and deal in machines, devices and equipment for the treatment of flax, hemp, or other fibrous material, with 500,000 shares no par value stock by William W. Hart, Harry L. Wright, and Charles H. C. Leggott.

TORONTO, ONT.—Bids have been called by B. H. and F. Prack, architects, 606 Lister building, Hamilton, Ont., for an addition to the plant of W. D. Beath & Sons Ltd., Symington avenue, manufacturer of electric hoists, barn door tracks, steel drums, etc. Building to be 1 story, 123 x 146 feet.

TORONTO, ONT.—Gray Ball Bearing Co., 686 St. Clarens avenue, has purchased a site of 1½ acres at Lansdowne and Royce avenues, where it proposes to start work immediately on a plant for the manufacture of automobile parts, etc. It is planned to have the plant in operation before the end of this year.

WALKERVILLE, ONT.—Hiram Walker Metal Products Ltd., Kildare road, contemplates erecting three new buildings in connection with its plant here, to consist of one galvanized iron building, one brick building and one frame building, all with concrete foundations.

MONTREAL, QUE.—Commercial Aero Transport Ltd. has been incorporated to manufacture and deal in airplanes, airships, balloons, etc., with $50,000 capital and 2500 shares no par value stock by Rene Chenevert, Max Burnfield, Philip Meyerovitch and others.

MONTREAL, QUE.—British Smelting & Refining Co. Ltd. has been incorporated to carry on the business as manufacturer, founder and smelter of all kinds of metals and metal products, with $50,000 capital by Lazarus Phillips, Lionel A. Sperber, and Harry Blanshey.

VILLE EMARD, QUE.—Canadian Tube & Steel Products Ltd., 107 Hamilton street, has awarded contract for addition to its plant here to Reid Bros., Ltd., 511 St. Catharines street west, Montreal, Que.

EASTEND, SASK.—Dominion Electric Co., Shaunavon, Sask., is making arrangements for the erection of a modern electric light and power plant here.

LLOYDMINSTER, SASK.—Canadian Utilities Ltd., head office at Calgary, Alta., plans extensive changes and improvements to power plant here including the installation of a new 300-horsepower unit.

MELVILLE, SASK.—Town council contemplates installing new sewage disposal plant here including complete pumps and equipment.

NOKOMIS, SASK.—Canadian Utilities Ltd. will build a power plant here and has let general contract to R. H. Preiss.

SASKATOON, SASK.—City council is in the market for steam turbine generator unit and other equipment for power plant here.

New Trade Publications

LIFT TRUCKS—Lewis-Shepard Co., Boston, has issued a catalog of its lift trucks and accessories for storing and moving materials. It is illustrated and each item is described.

BEARING METAL—Invincible Bearing Metals Corp., Sandusky, O., has issued a leaflet describing its product, illustrated by microphotographs of two samples of bearing metal.

ELECTRIC MOTORS—General Electric Co., Schenectady, N. Y., has issued a bulletin describing its general purpose synchronous motors in various types. It is illustrated to show details of construction.

BLOWERS—Bayley Blower Co., Milwaukee, in a current bulletin describes induced draft and exhaust fans as applied to firing locomotives and exhausting gases from railroad roundhouses. Data of actual performance are given in tabular form. Drawings show details of construction.

INDUSTRIAL INSULATION—Celite Products Co., Los Angeles, has prepared a bulletin on the insulation of industrial furnaces and ovens. It is illustrated by drawings to show the method of insulation employed by various furnace designers. This includes electric and fuel-fired furnaces for heat treating work of many kinds.

STEEL CASTINGS—A bulletin by the Lebanon Steel Foundry, Lebanon, Pa., describes its technical department. Emphasis is laid on scientific control and systematic organized research. Illustrations show the various laboratories, which are described in the text. Application of laboratory results to practical uses in the foundry are outlined.

AIR COMPRESSORS—Chicago Pneumatic Tool Co., New York, has issued five bulletins, illustrated, describing its power-driven duplex air compressors, straight-line steam and power-driven compressors, semidiesel oil engines, vertical duplex compressors, electric motor driven, portable compressors, and vertical simplex compressors. Details and specifications are given for each machine.

SAW SHARPENING—Norton Co., Worcester, Mass., has issued two booklets, dealing with saw sharpening, in western and in southern sawmills. The problems of proper wheel and speed are discussed as applied to practice in the two regions. A table of saw speeds and stress is provided in each. The booklets form a guide to best results in sharpening the large saws used in these mills.

ALLOY STEEL DRILL ROD—A booklet by the Kidd Drawn Steel Co., Aliquippa, Pa., has just been issued. It deals with tool and alloy steel drill rod manufactured by this company. Characteristics of the material are sketched and means employed to insure quality. A list of rod sizes and prices is given. Special shapes drawn to accurate shape for use in place of machined steel are also described and illustrated. The booklet is a guide to the use of drawn steel in many applications.

MINE VENTILATION—E. I. du Pont de Nemours & Co., Wilmington, Del., has issued a booklet on auxiliary ventilation for metal mines. It contains discussion of importance of this factor in mining and describes the operation of a flexible tubing of its manufacture. It contains 35 illustrations, many being photographs of actual conditions in mines, showing the tubing in place. A friction chart is given to determine the volume of air delivered at varying distances from the fan.

European Iron and Steel Statistics

Gross Tons

Pig Iron Production

Monthly Average	United Kingdom	France	Belgium	Luxemburg	Germany*
1912	729,000	405,000	192,000	184,800	1,279,200
1913	855,000	427,200	203,800	209,000	1,374,400
1921	218,000	280,300	71,800	79,600	643,200
1922	408,500	428,900	132,300	138,200	770,500
1923	620,000	445,600	179,100	115,400	404,700
1924	609,000	631,100	230,300	177,000	640,500
1925	521,800	696,800	208,500	192,300	834,500
1926	203,500	770,500	278,800	206,100	791,000
1927					
January	434,600	792,400	311,500	224,100	1,044,600
February	571,100	705,100	288,000	204,500	953,600
March	671,800	788,500	309,400	226,200	1,068,900
April	680,000	761,800	305,100	221,000	1,035,400
May	720,100	781,800	314,000	233,900	1,112,100
June	651,300	735,000	297,300	220,300	1,050,900
July	645,800	757,100	314,700	221,700	1,091,600
August	596,100	761,400	311,700	234,500	1,098,100
September	591,500	749,500	304,000	225,500	1,087,400
October	596,300	782,600	317,200	226,600	1,121,600
November	575,900	750,100	308,200	217,800	1,101,900
December	559,100	783,600	311,900	224,600	1,131,700
1928					
January	560,500	796,400	309,700	226,000	1,162,100
February	550,800	772,100	297,300	216,700	1,104,800
March	592,600	845,000	321,400	236,500	1,152,200
April	563,100	821,100	313,220	223,400	1,029,100
May	591,500	857,400	323,700	230,200	1,027,700
June	563,700	830,800	316,000	226,900	1,005,400
July	537,800	.....	.....	.....	1,018,500

Ingots and Castings Production

Monthly Average	United Kingdom	France	Belgium	Luxemburg	Germany*
1912	566,000	363,000	206,000	79,400	1,339,600
1913	638,600	384,500	202,300	109,000	1,445,700
1921	308,600	254,500	62,800	61,900	819,700
1922	490,100	372,000	128,400	114,300	960,500
1923	706,800	419,100	186,200	98,300	517,000
1924	685,100	566,000	234,700	154,300	*806,500
1925	615,500	608,300	197,700	170,800	1,000,000
1926	296,700	687,900	276,800	184,100	1,012,500
1927					
January	730,700	662,900	315,700	192,300	1,288,500
February	826,800	618,200	292,200	181,300	1,214,300
March	949,600	692,900	309,700	199,800	1,393,600
April	850,100	669,900	296,400	202,800	1,269,100
May	884,600	700,800	316,100	206,900	1,356,200
June	747,300	661,400	295,100	200,000	1,307,200
July	687,100	666,300	309,200	199,800	1,341,100
August	643,100	683,200	320,600	212,500	1,409,700
September	777,000	682,400	285,400	209,600	1,353,600
October	699,000	711,600	307,200	211,800	1,392,300
November	698,700	671,300	305,200	204,200	1,380,000
December	604,900	723,500	305,900	210,500	1,351,100
1928					
January	626,200	738,300	310,700	209,600	1,446,500
February	764,400	726,500	305,600	201,>00	1,301,300
March	793,300	791,400	321,600	216,900	1,398,200
April	644,100	726,500	300,300	199,400	1,143,300
May	752,700	781,600	320,100	211,400	1,228,300
June	709,000	784,600	323,800	211,600	1,274,300
July	666,900	.....	.....	.....	1,290,600

*German pre-war boundaries for 1912 and 1913; from 1919 the figures do not include the Saar district returns.

Imports

	United Kingdom	Belgium and† France	Luxemburg	Germany*
Average monthly 1912	166,400	16,400	87,000	27,300
Average monthly 1913	185,900	14,100	72,900	25,000
Average monthly 1921	136,700	41,300	43,300	54,000
Average monthly 1922	73,500	63,300	47,700	152,300
Average monthly 1923	110,200	58,500	43,700	145,000
Average monthly 1924	202,400	57,100	46,800	160,000
Average monthly 1925	226,700	14,100	44,500	98,400
Average monthly 1926	311,700	14,200	50,200	86,500
1927				
January	555,500	7,900	45,800	129,500
February	443,400	10,100	36,800	143,400
March	478,100	10,500	54,060	129,800
April	404,700	12,000	47,300	200,000
May	355,900	15,100	47,500	186,400
June	332,600	14,100	56,300	186,300
July	336,300	12,000	52,700	189,000
August	286,300	9,900	63,400	211,300
September	312,000	6,900	50,000	210,900
October	336,000	8,100	68,000	232,800
November	284,800	8,200	57,800	223,900
December	280,500	11,400	59,800	190,100
1928				
January	283,900	6,000	65,000	200,800
February	286,900	10,100	72,000	179,600
March	271,500	16,800	70,200	187,700
April	252,700	10,000	61,700	189,100
May	236,900	.....	63,>00	164,800
June	210,400	.....	74,200	162,200
July	219,000	.....	.....	.....

*Luxemburg is ncluded with Germany in 1912 and 1913.

Exports

	United Kingdom	Belgium and† France	Luxemburg	Germany*
Average monthly 1912	400,600	41,500	124,500	482,400
Average monthly 1913	414,100	51,600	129,200	517,300
Average monthly 1921	141,400	133,800	75,600	160,000
Average monthly 1922	283,400	161,400	175,900	209,700
Average monthly 1923	360,000	181,900	207,900	110,000
Average monthly 1924	321,100	231,100	282,200	130,000
Average monthly 1925	310,900	321,700	262,800	267,600
Average monthly 1926	249,000	343,800	308,900	402,000
1927				
January	219,400	463,300	345,900	478,400
February	251,700	480,600	364,500	352,900
March	353,000	472,700	415,000	374,100
April	334,500	519,100	383,800	344,300
May	422,400	461,900	364,800	344,300
June	366,100	432,900	351,300	307,600
July	389,600	454,600	375,700	340,600
August	342,400	465,800	426,700	333,200
September	384,900	453,600	357,100	346,800
October	384,800	508,400	372,900	340,700
November	399,100	449,300	392,900	326,800
December	381,800	440,300	456,300	340,600
1928				
January	332,200	408,100	274,600	363,026
February	317,000	462,700	395,500	390,776
March	409,300	443,500	453,100	334,798
April	344,300	398,800	323,600	412,810
May	359,000	390,800	332,700	378,500
June	365,900	.....	375,100	420,500
July	333,100	.....	.....	.....

†Luxemburg included with Belgium from 1922 onward.

American Iron and Steel Exports, Imports

Gross Tons

	Imports	Exports
1928		
January	58,635	205,766
February	47,628	185,915
March	74,128	221,935
April	72,329	215,184
May	72,106	267,890
June	65,819	262,052
July	47,830	253,336
1927		
January	63,404	215,235
February	49,451	166,128
March	61,872	171,094
April	60,374	192,339
May	79,814	202,708
June	69,017	184,364
July	61,112	190,502
August	68,386	175,636
September	58,464	166,352
October	52,503	170,255
November	61,882	177,928
December	64,188	168,428
Total	750,467	2,180,969
1926		
January	79,067	174,585
February	100,213	157,187
March	93,107	169,438
April	107,636	194,449
May	108,731	173,418
June	124,215	159,506
July	82,411	194,717
August	91,578	171,588
September	85,484	182,071
October	81,830	172,070
November	81,259	219,830
December	75,559	198,189
Total	1,111,090	2,167,048
1925		
January	77,065	141,714
February	92,380	102,302
March	92,110	155,386
April	71,249	155,426
May	68,117	150,612
June	83,330	136,847
July	64,642	138,670
August	68,489	188,963
September	68,445	136,754
October	80,163	141,817
November	79,771	171,134
December	98,400	142,209
Total	943,240	1,762,571

Yearly Totals

1924	556,281	1,805,064
1923	734,734	2,009,141
1922	712,895	2,005,100
1921	135,825	2,150,276
1920	421,274	4,934,087
1919	322,264	4,397,295
1918	169,110	5,338,019
1917	330,301	6,465,053
1916	328,965	6,110,732
1915	282,396	3,532,564
1914	289,775	1,549,554
1913	317,260	2,745,635
1912	225,072	2,947,596
1911	262,457	2,187,725
1910	510,730	1,537,943
1909	363,984	1,243,585
1908	205,845	964,242
1907	662,358	1,301,981
1906	577,809	1,325,740
1905	416,000	1,011,255
1904	266,398	1,167,674
1903	1,178,797	326,590
1902	1,212,484	1,103,664
1901	221,297	700,852
1900	209,955	1,154,284

IN MILLS

—where loads reach Titanic proportions—where giants exchange buffets—where shock and thrust and friction—yes and *costs*—mount higher and higher—there, bearings must be *more than anti-friction!*

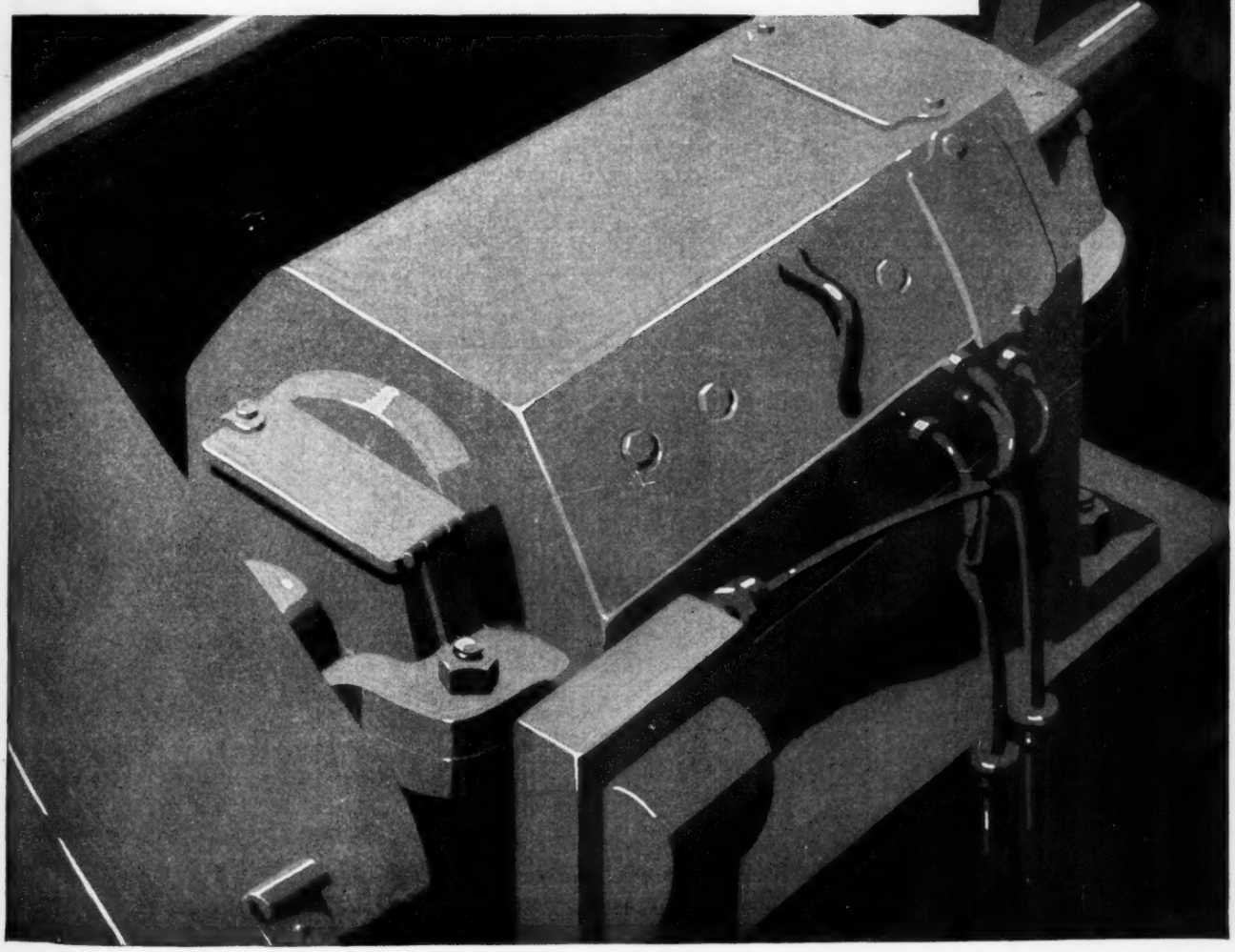
The bearings of mill motors must play their part faithfully in this formidable struggle—must serve continuously, must cut power costs, must save lubricant and keep that lubricant to themselves and away from armature windings and commutators, must keep mills rolling without shutdowns.

That is exactly what Timken Bearings do!

IN MILL MOTORS, Timken electric steel, Timken tapered construction and Timken *POSITIVELY ALIGNED ROLLS* furnish such a strong combination that nothing else will serve like Timken Bearings.

THE TIMKEN ROLLER BEARING CO., CANTON, OHIO

TIMKEN *Tapered Roller* BEARINGS



Discounts and Extras

Steel Pipe

Pittsburgh and Lorain basing discounts, jobber's carloads.

Evanston, Ill., and Indiana Harbor, Ind., take differential 2 points less discount.

Chicago takes differential 2½ points less than Pittsburgh-Lorain basis.

Butt Weld

	Black	Galvanized
⅛-inch	45	19½
¼ and ⅜-inch	51	25½
½-inch	56	42½
¾-inch	60	48½
1 to 3-inch	62	50½

Lap Weld

2-inch	55	43½
2½ to 6-inch	59	47½
7 to 8-inch	56	43½
9 and 10-inch	54	41½
11 and 12-inch	53	40½

REAMED AND DRIFTED

Butt Weld

1 to 3-inch	60	48½

Lap Weld

2-inch	53	41½
2½ to 6-inch	57	45½

EXTRA STRONG—PLAIN ENDS

Butt Weld

⅛-inch	41	24½
¼ and ⅜-inch	47	30½
½-inch	53	42½
¾-inch	58	47½
1 to 1½-inch	60	49½
2 to 3-inch	61	50½

Lap Weld

2-inch	53	42½
2½ to 4-inch	57	46½
4½ to 6-inch	56	45½
7 to 8-inch	52	39½
9 and 10-inch	45	32½
11 and 12-inch	44	31½

DOUBLE EXTRA STRONG

Butt Weld

½-inch	42	32½
¾ to 1½-inch	45	35½
2 to 2½-inch	47	37½

Lap Weld

2-inch	41	32½
2½ to 4-inch	43	34½
4½ to 6-inch	42	33½
7 to 8-inch	38	25½

(Note—Large jobbers obtain additional preferential discounts of 1 and 5 on black and 1½ and 5 on galvanized. Extra 5 per cent granted in the 4th quarter 1927 and 1st quarter 1928 discontinued April 2, 1928.)

Wrought Iron Pipe

Pittsburgh basing discounts, jobbers' carloads. Individual quotations made on delivered basis.

THREADS AND COUPLINGS

Butt Weld

⅛ and ¾-inch	+11	+39
½-inch	22	2
¾-inch	28	11
1 to 1½-inch	30	13

Lap Weld

1¼ and 1½-inch	Upon application	
2-inch	23	7
2½ to 3-inch	26	11
3 to 6-inch	28	13
7 to 12-inch	26	11

PLUGGED AND REAMED

Two points less than above

EXTRA STRONG, PLAIN ENDS

⅛ and ¾-inch	+19	+54
½-inch	21	7
¾-inch	28	12
1 to 1½-inch	30	14

Lap Weld

2-inch	23	9
2½ to 4-inch	29	15
4½ to 6-inch	28	14
7 to 8-inch	21	7
9 to 12-inch	16	2

DOUBLE EXTRA STRONG

Butt Weld

½-inch	+47½	+59½
¾-inch	+28	+40
1-inch	+34	+46
1¼-inch	+28	+40
1½-inch	+27	+39

Lap Weld

2 and 2½-inch	+13	+25
3 and 4-inch	+ 8	+17
4½ to 6-inch	+ 9	+18
8-inch	+12	.....

(Note—Large jobbers obtain additional preferential discounts of 1, 5 and 2½ on black and galvanized.)

Boiler Tubes

Pittsburgh carload discounts. Less carloads 4 points less

STEEL (Lap Weld)

2 and 2¼-inch	27 off
2½ and 2¾-inch	37 off
3-inch	40 off
3¼ to 3¾-inch	42½ off
4 to 13-inch	46 off

(Note—Additional discounts of seven extra 5 per cents now being given on 21,000 pounds or more.)

CHARCOAL IRON

1½-inch	+18
1¾-inch	+ 8
2 and 2¼-inch	2 off
2½ to 3-inch	7 off
3¼ to 4½-inch	9 off

(Note—Additional discounts of two 10's and one 2½ now being given on 12,000 pounds or more.)

SEAMLESS COLD DRAWN

1-inch	63 off
1¼ and 1½-inch	55 off
1¾-inch	39 off
2 and 2¼-inch	34 off
2½ and 2¾-inch	42 off
3-inch	48 off
3¼ and 3½-inch	50 off
4-inch	53 off
4½, 5 and 6-inch	45 off

SEAMLESS HOT ROLLED

2 and 2½-inch	40 off
2½ and 2¾-inch	48 off
3-inch	52 off
3¼ and 3½-inch	56 off
4-inch	59 off
4½, 5 and 6-inch	48 off

SEAMLESS STEEL MERCHANT BOILER TUBES

Extras:

Add $8 per ton for more than four gages heavier than standard and add 10 per cent to theoretical weight.

Add 5 per cent for lengths over 24 feet and not over 26 feet.

Smaller tubes than 1-inch and lighter than standard gage to be sold at mechanical tubing list and discount.

Intermediate sizes and gages not listed above take price of next larger outside diameter and heavier gage.

SEAMLESS STEEL MECHANICAL TUBING

Base Discounts on New List July 1, 1925

Carbon 0.10 to 0.30 per cent.....50 to 55 off
Carbon 0.30 to 0.40 per cent.....45 to 50 off

SEAMLESS STEEL LOCOMOTIVE AND SUPERHEATER TUBES

Outside diameter	Gage	Net prices per foot f.o.b. Pittsburgh Price
2-inch	12-gage	14¼c
2-inch	11-gage	15c
2-inch	10-gage	16c
2¼-inch	12-gage	16c
2¼-inch	11-gage	17c
2¼-inch	10-gage	18c
3-inch	7-gage	33c
5⅝-inch	9-gage	50c
5½-inch	9-gage	52c

Plus usual extras for forming and for long lengths over 18 feet and for commercially exact lengths.

Plate Extras

BASE

Rectangular plates, tank steel or conforming to manufacturers' Standard Specifications for structural steel, dated Nov. 24, 1922, or equivalent, ¼-inch thick and over on thinnest edge, (except for ¼-inch or 72 inches wide when ordered to weight in pounds per square foot—see width and gage extras), 100 inches wide and under, down to but not including 6 inches wide, 5 feet 0 inches long up to published limit in length but not over 80 feet 0 inch, are base. Extras per pound for width or diameter.

All Plates Rectangular or Otherwise

¼-inch thick and heavier, but not less than 11 pounds per square foot, if ordered to weigh—

Over 100 inches to and including 110 inches	.05c
Over 110 inches to and including 115 inches	.10c
Over 115 inches to and including 120 inches	.15c
Over 120 inches to and including 125 inches	.25c
Over 125 inches to and including 128 inches	.50c
Plates less than ¼-inch or lighter than 11 pounds per square foot.	
Over 72 inches to and including 84 inches	.10c
Over 84 inches to and including 96 inches	.20c
Over 96 inches to and including 100 inches	.30c
Over 100 inches add .35c to width extras for plates ¼-inch thick and heavier.	

GAGE

Plates Not Exceeding 72 Inches Wide

Plates less than ¼-inch gage, to and including 3/16-inch; or lighter than 10.2 pounds per square foot, to and including 7.65 pounds per square foot	.20c

Plates Over 72 Inches Wide

Plates less than ¼-inch gage, to and including 3/16-inch; or lighter than 11 pounds per square foot, to but not including 7.65 pounds per square foot	.20c
Plates ordered 7.65 pounds per square foot	.30c

QUALITIES

Pressing steel	.10c
Flange steel (boiler grade)	.15c
Ordinary firebox steel	.20c
Stillbottom steel	.30c
Locomotive firebox steel	.50c
Marine steel	1.50c
Hull materials subject to U. S. Navy Dept. specifications for medium or soft steel	.10c
High tensile hull steel subject to U. S. Navy Dept. or equivalent specifications	1.00c
Boiler steel subject to U. S. Navy Dept. specifications, classes A and B	1.50c
Hull plates to hull specifications, required to stand cold flanging, take extra for flange steel.	

Floor Plates

Checkered plates	1.75c

Checkered plates are not furnished to sketch and are rolled from "Stock Steel" only. No physical tests will be made on checkered plates.

INSPECTION

Mill inspection .....No extra

Charges for other inspection, such as Lloyd's or American bureau of shipping, will be made by inspection bureau direct to buyer.

CUTTING

LENGTH OR DIAMETER

All Plates, Rectangular or Otherwise

Five feet and over up to published limit of length, but not over 80 feet	No extra
Under 5 feet to 3 feet inclusive	.10c
Under 3 feet to 2 feet inclusive	.25c
Under 2 feet to 1 foot inclusive	.50c
Under 1 foot	1.55c
Over 80 feet to 100 feet inclusive	.10c

Over 100 feet add .25c plus .05c for every additional 2 feet or fraction thereof.

Regular Sketches

With not more than four straight cuts. (Including straight taper plates)

Additional extra	.10c

Irregular Sketches

With not more than four straight cuts. (Sketches cannot be sheared with re-entrant angles)

Additional extra	.20c

"We Marvel at Its Large Capacity"

For the past two years the Santa Clara Gravel Company have been using an Industrial Brownhoist No. 1 crawler crane for handling sand and gravel at their pit. In writing us regarding the performance of their machine they say: "We marvel at its exceptionally large capacity for so small a rig."

Big output, economy of operation, and long life are inherent advantages of every Industrial Brownhoist. Look over one of these machines carefully and you will soon see why. Separate clutches for each operating function, a more efficient boom hoist mechanism and better weight distribution are among the features that insure better service.

Regardless of what your job may be there is an Industrial Brownhoist of the proper size to insure you the same satisfaction as the Santa Clara Gravel Company is now enjoying. It will pay you to have our catalogs on file.

INDUSTRIAL BROWNHOIST

Shovels
Cranes
Draglines
Trench Hoes
½, ¾, 1, 1⅛, 1¼ Yard Capacity

Industrial Brownhoist Corporation

General Offices: Cleveland, Ohio

District Offices: New York, Philadelphia, Pittsburgh, Detroit, Chicago, San Francisco, New Orleans.

INDUSTRIAL BROWNHOIST

Iron and Steel Freight Rates

Finished Material

Per 100 Pounds

PITTSBURGH TO:

Atlanta	$0.58
Baltimore	0.31
Birmingham	0.58
Boston	0.365
Buffalo	0.265
Chattanooga	0.50
Chicago	0.34
Cincinnati	0.295
Cleveland	0.19
Columbus	0.255
Dallas (tin plate .90)	1.02
Denver	1.15
Detroit	0.295
Duluth	0.60
Indianapolis	0.31
Kansas City	0.735
Louisville	0.33
Milwaukee	0.37
Minneapolis and St. Paul	0.60
New Orleans	0.67
New York	0.34
Omaha	0.735
Pacific coast (tin plate)	0.90
Pacific coast (all rail)	1.15
Philadelphia	0.32
South Bend, Ind.	0.32
St. Louis	0.43
Toledo	0.27
Topeka	0.85
Youngstown	0.11

CHICAGO, GARY, INDIANA HARBOR, EVANSTON, JOLIET AND WAUKEGAN TO:

Aberdeen, S. D.	$0.55
Ashland, Wis., and Duluth	0.305
Atlanta	0.58
Beaumont, Tex. (pipe, .49)	0.68
Birmingham	0.53
Cairo, Ill.	0.26
Caspar, Wyo. (pipe .835)	0.95
Cedar Rapids, Iowa, (wire .345)	0.245
Chattanooga, Tenn.	0.49
Dallas, Tex. (pipe .69) (rail and river .75)	0.84
Denver	0.83
Des Moines, Iowa	0.295
Detroit	0.275
Grand Rapids, Mich.	0.255
Green Bay, Manitowoc, Wis.	0.205
Indianapolis (pipe .25)	0.18
Kalamazoo, Mich.	0.22
Kansas City (pipe .35)	0.42
Madison, Wis.	0.14
Memphis, Tenn. (all rail)	0.38
Memphis, Tenn. (rail and river)	0.315
Milwaukee	0.095
Minneapolis-St. Paul	0.2275
Muskogee, Okla. (pipe .60)	0.69
New Orleans (all rail)	0.55
New Orleans (rail and river)	0.455
Omaha, Nebr. (pipe .35)	0.42
Pacific Coast (tin plate .75)	1.00
Rock Island, Ill.	0.17
St. Joseph, Mo. (pipe .35)	0.42
South Bend, Ind. (sheets .13)	0.125
St. Louis	0.22
Tulsa, Okla. (pipe .60)	0.69

CLEVELAND TO:

Akron, O.	$0.09
Atlanta	0.57
Baltimore	0.37
Boston	0.43
Buffalo	0.25
Canton	0.095
Chattanooga	0.50
Chicago	0.30
Cincinnati	0.27
Columbus	0.215
Detroit (rail)	0.235
Indianapolis	0.28
New Orleans	0.65
New York	0.40
Philadelphia	0.38
St. Louis	0.36
Toledo	0.27

YOUNGSTOWN TO:

Akron, O.	$0.095
Baltimore	0.345
Beaumont, Tex. (pipe .67)	0.87
Boston	0.405
Buffalo	0.25
Canton	0.095
Caspar, Wyo.	1.15
Chattanooga	0.50
Chicago	0.32
Cincinnati	0.285
Cleveland	0.095
Columbus	0.25
Dallas (pipe .855)	1.02
Denver (pipe 1.115 Min. 60,000 lbs.)	1.13
Detroit	0.265
Indianapolis	0.30
Little Rock, Ark. (pipe .75)	0.70
Memphis	0.54
New Orleans	0.66
New York	0.375
Pacific coast	1.15
Philadelphia	0.355
Shreveport, La. (pipe .84)	0.79
Smackover, Ark. (pipe .82)	0.77
St. Louis	0.38
Toledo	0.24
Tulsa, Okla. (pipe .855)	0.87

LORAIN TO:

Atlanta	$0.57
Bakersfield, Long Beach and Los Angeles	1.15
Beaumont, Tex.	0.655
Caspar, Wyo.	1.125
Chattanooga	0.50
Chicago	0.36
Cincinnati	0.265
Cleveland	0.07
Coffeyville, Kans.	0.70
Dallas	0.84
Detroit	0.215
New Orleans	0.65
*Shreveport, La.	0.76
Smackover, Ark.	0.77
St. Louis	0.355
Tulsa, Okla.	0.84
Wichita	0.84

*Minimum 80,000 pounds.

FROM / TO	SPARROWS POINT	BETHLEHEM	COATESVILLE	PITTSBURGH	BUFFALO
Massachusetts Points..	25.5	25.5	25.5	36.5	33.0
Connecticut Points	25.5	25.5	25.5	36.5	33.0
Albany, N. Y.	22.5	22.5	22.5	34.0	21.5
Troy, N. Y.	22.5	22.5	22.5	34.0	21.5
Schenectady, N. Y.	22.5	22.5	22.5	34.0	21.5
Syracuse, N. Y.	22.5	22.5	22.5	28.5	17.5
Rochester, N. Y.	22.5	22.5	22.5	26.5	11.5
Buffalo	32.0	32.0	32.0	26.5	.....
Erie, Pa.	30.5	31.0	31.0	19.0	13.5
New York City	19.0	14.5	17.5	34.0	32.0
Brooklyn, N. Y.	19.0	14.5	17.5	34.0	32.0
Newark, N. J.	19.0	14.5	17.5	34.0	32.0
Plainfield, N. J.	19.0	14.5	17.5	34.0	32.0
Bethlehem, Pa.	19.0	.....	17.5	32.0	32.0
Allentown, Pa.	19.0	3.0	17.5	32.0	32.0
Reading, Pa.	15.5	13.0	10.0	32.0	32.0
Lancaster, Pa.	14.5	17.5	9.0	32.0	32.0
Wilkes-Barre, Pa.	19.0	13.0	19.0	32.0	28.0
Pottstown, Pa.	15.5	14.5	10.0	32.0	32.0
Berwick, Pa.	19.0	19.0	19.0	32.0	28.0
Milton, Pa.	19.0	19.0	19.0	31.0	28.0
Ambler, Pa.	19.0	13.0	15.5	32.0	32.0
York, Pa.	14.5	19.0	12.5	31.0	32.0
Scranton, Pa.	19.0	13.0	19.0	32.0	28.0
Philadelphia	14.5	13.0	10.0	32.0	32.0
Baltimore	6.0	19.0	14.5	31.0	32.0
Hagerstown, Md.	19.0	22.5	22.5	31.0	32.0
Richmond, Va.	21.5	28.5	24.0	38.0	38.0
Newport News, Va.	21.5	28.5	24.0	38.0	38.0
Charlotte, N. C.	40.5	44.0	43.0	51.0	53.0

Pig Iron

In gross tons

BIRMINGHAM, ALA., TO:

Boston (rail and water)	$6.91
Chicago	6.01
Chicago (rail and water)	4.18
Cincinnati	6.01
Jersey City, N. J.	8.06
Louisville, Ky.	3.39
New York	9.24
Philadelphia (rail and water)	6.01
St. Louis	4.42

EVERETT, MASS., TO:

Claremont, N. H.	$2.52
Hartford, Conn. (plus $5 per car for switching to New Haven tracks)	2.90
New Haven, Conn.	3.30
Pittsfield, Mass.	2.65
Portland, Me.	2.39
Providence, R. I.	2.10
Rutland, Vt.	2.65
Springfield, Mass	2.27
Worcester, Mass.	1.89

PORT HENRY, N. Y. TO:

Boston (New Haven R. R. $3.65)	$3.15
Claremont, N. H.	3.65
Hartford, Conn.	3.65
New Haven, Conn.	3.28
Pittsfield, Mass. (New Haven R. R. $3.65)	3.00
Portland, Me.	3.65
Rutland, Vt.	1.39
Providence, R. I.	3.65
Springfield, Mass. (New Haven R. R. $3.65)	3.00
Worcester, Mass.	3.15

CHICAGO TO:

Des Moines, Iowa	$3.75
Milwaukee	1.00
Minneapolis, St. Paul	3.04
Moline, Ill.	1.76
Omaha, Nebr.	4.97
St. Louis	2.16

CLEVELAND TO:

Cincinnati	$2.90
Columbus, O.	2.10
Dayton, O	2.52
Springfield, O.	2.39
Canton, O.	1.26
Akron, O.	1.26
Youngstown, O.	1.76
Crestline, O.	1.76
Lima, O.	2.39
Mansfield, O.	1.76
Detroit	2.75
Indianapolis	3.30

TOLEDO, O. TO:

Cincinnati	$2.65
Columbus, O.	2.10
Dayton, O.	2.27
Springfield, O.	2.07
Canton, O.	1.77
Akron, O.	2.25
Youngstown, O.	2.65
Lima, O.	1.68
Mansfield, O.	1.76
Detroit	1.00
Indianapolis	2.96
Battle Creek, Mich.	2.40
Flint, Mich.	2.10
Jackson, Mich.	1.90
Grand Rapids, Mich.	2.90
Kalamazoo, Mich.	2.65
Lansing, Mich.	2.10

DETROIT TO:

Indianapolis	$3.15
Toledo, O.	1.00
Springfield, O.	2.61
Dayton, O.	2.90
Jackson, Mich.	1.90
Battle Creek, Mich.	2.40
Flint, Mich.	1.85
Grand Rapids, Mich.	2.90
Kalamazoo, Mich.	2.65
Lansing, Mich.	1.95

BUFFALO TO:

Albany, N. Y.	$2.27
New England (rail)	4.91
New York (rail)	4.91
Philadelphia	4.91
Rochester, N. Y.	1.39

TROY, N. Y. TO:

Boston	$2.90
Worcester, Mass.	2.65
Springfield, Mass.	2.39
Providence, R. I.	3.66
Hartford, Conn.	3.66
New Haven, Conn.	4.10
Claremont, N. H.	2.65
Portland, Me.	3.15